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**CHORDITIS CANTORUM. A CONTRIBUTION TO THE STUDY
OF THE ETIOLOGY, PATHOLOGY AND TREATMENT
OF SINGERS' NODES, OR NODULES ON THE
VOCAL CHORDS.**

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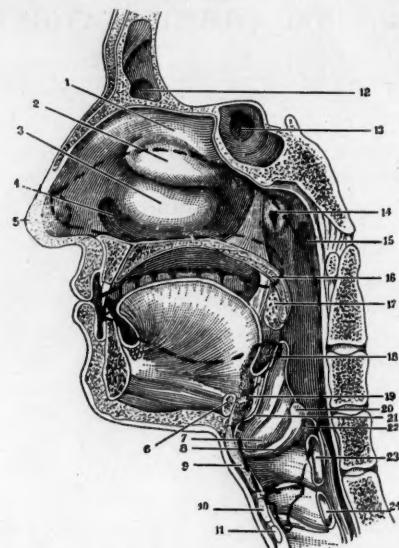
In my paper on "Observations of Voice and Voice Culture" presented in 1898, I made the statement that "the action of the pharyngeal and nasal cavities, or hollow spaces, is prior and anterior to the action of the vocal bands, for the rest of the voice, showing that we need for tone and overtone production, quality, pitch and amplification, something more than a mere action of the vocal cords in order to produce tone properly."

In my present essay I shall proceed to take up certain mooted points which have been brought to my attention as a result of further observation and study of this object under traumatic conditions.

A well-known singer, who was not able to retain pitch, and had a break at F sharp, and whose voice after attempts at phonation broke, forming a node between the anterior third and thyroid end of the vocal cartilage, proved to me that a blow struck on the side of the larynx and injuring one of the exterior or extrinsic muscles of attachment, is capable of producing a certain and specific injury at a point on the vocal cord within. This fact completely overrules the contention of authorities who maintain that a node cannot be formed at a point farther up in the cord than the anterior third.

The study of this injury has proved so interesting to me, and has

brought out so many points in further knowledge of the mechanism, that, upon the invitation and with the approval of your president, I have determined to lay them concisely before you, and to illustrate them with the assistance of one of the best known experts in vocal anatomy, Miss Dora Louisa Topping, who is capable of demonstrating by separate or collective muscular movements the points to be laid before you. In one sense these points are not new. Attention has been called to them by one of the most learned vocal anatomists of modern times, John Howard, and since his research



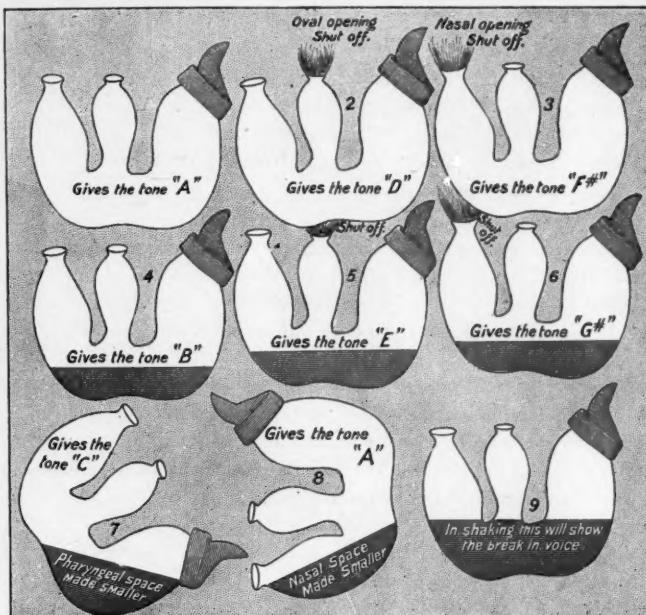
A scheme showing the hollow spaces of the parts above the glottis that are under control.

no one has ever added materially to the conclusions he reached. His work in the dissecting room and power of devising exercises of muscular control are without parallel.

My first step will be to show you certain relationships existing between the physics and anatomy of the voice most essential in forming change of pitch, quality and overtone. Your attention is directed to the three hollow spaces—nasal, oral and laryngeal. Nasal, from the tip of the nose to the base of the soft palate; oral, from the lips and teeth to the top of the larynx; laryngeal, the

chamber containing the larynx itself. The action of these hollow spaces has much to do with the modification and modulation of the voice.

In a former article I described some apparatus which I devised for the purpose of showing the effect that the separation or combination of these hollow spaces has upon the sound produced. Here is a glass vessel (indicating) with three openings, two covered with rubber. I whistle one tone (illustrating), press one rub-



ber about half an inch inward, and you notice an increase in the height of the pitch. (See "Observations on Voice and Voice Failure," by Frank E. Miller and H. Theodore Wangeman). I now pour water in the vessel and produce a similar result. I will hold the water in the vessel over the rubber, which I will press to some extent, and you will observe hardly any change in the pitch of the tone. (This latter feature being an interesting physical fact, you recognize from this experiment the useful functions of the converging loops which unite about the uvula, making it possible to

change three or four half tones while hardly changing the aspect of the hollow spaces.) These three hollow spaces seem, more than all other hollow spaces of the vocal organs, to be capable of being controlled by their own surroundings.

Here is another vessel, shaped to imitate closely the three hollow spaces. I pour one-third of an inch of water into this vessel, and by giving to the same three or four different positions I change the pitch from three to four half-tones. You will observe that the hollow spaces in total must remain stationary, and the only change I make is, turning a little more or less water from a supposed nasal into a laryngeal cavity.

I will repeat this experiment with different quantities of water. Another vessel, with two openings, but having a different form of hollow space, will show that a whistle can be blown so as to produce vibrations at either opening. Both openings are the same size, yet they give two tones of different and distinct pitch.

Here is still another vessel, closely resembling the three most prominent hollow spaces, which happens to be tuned to the three tones of the D cord. I connect a penny whistle of a very high, shrill note to the laryngeal part, as indicated in the chart, and shall use the vessel as illustrated in the different pictures, Nos. 1 to 9.

Here in Fig. 9, are shown the breaks of the voice; in Fig. 7, change in the pharyngeal space; in Fig. 8, change in the nasal space, which I demonstrated to you on the glass vessel.

The break of the voice, as shown and demonstrated in Fig. 9, is most interesting, as it shows how an unhealthy condition of the mucous membrane, or, by muscle action, the break in the voice may appear. While its practical value is just as the discovery of the North Pole would be, it demonstrates the correct action of air vibration and tone formation in these hollow spaces, which I will further show you in another glass vessel, with three hollow spaces tuned to tones close together in pitch. When I blow here (No. 2) softly, I make the middle space sound, while, with a harder blast on the whistle the end space vibrates two distinct tones higher, omitting the air vibrations in the middle space, and vice versa.

You are well aware that muscular action in the hollow spaces will draw the surfaces and form different shapes and sizes for each new pitch, and in a thousand different ways.

From a series of careful observations upon the action of mucous

membranes during voice production made by Madame Anna Lan-kow, an authority on vocal production, Mr. A. T. Wangemann, formerly chief physicist of Edison's Laboratory and myself, we came to the conclusion that these hollow spaces are to the vocal bands what the violin is to the strings, and that for every tone and vowel the mucous membranes of the hollow spaces must be drawn into a special position (including the position of the larynx) before the air in such hollow spaces can be brought into vibration by the action of the vocal bands. These vibrations of the air are the tone. On the other hand the vibration of the cords alone are never the tone. The surfaces of the mucous membranes are drawn into different shapes, particularly fit to produce tone-waves or to disturb them, and to produce in such tone-waves not only fundamental tones, but over-tones also.

Mr. A. T. Wangemann advanced the argument that when this is so the hollow spaces in order to produce a 16-foot bass tone, would have to form a tube of 16 feet, is at present without foundation. He can show "Koenigs-flames," where a resonator which ought to show 512 flames per second, under certain circumstances, shows only 256, 128, etc., vibrations per second. And he contends that when this is possible in a bass resonator, it is all the more true when it occurs in a hollow space, containing living membranes, nerves and muscles.

I remarked above that the hollow spaces remain in total stationary; that the changes made in such numerous ways form the changing of the space boundaries. This leads us to look deeply into the mechanism of these boundaries and find, if possible, the laws which govern their action.

Starting with the walls of the upper pharynx or nasal space, we find the back wall supported by a strong contractile muscular sheet called the "superior constrictor" muscle, while the front wall is formed by a union of the levatores-palati, (palate lifters) and ten-sores-palati, spreading from the uvula over the soft palate, to ptery-goid plate and petros bones, and either singly or together being simple to train and control. Extending downward from the uvula, starting from the hard palate and levatores-palati are the palato-pharyngei muscles, which form the inner arch seen back of the tongue on opening the mouth. These fasten directly to the upper posterior horns of the thyroid cartilage—the part of the larynx containing the vocal cords.

The middle or "oral" space is bounded by the superior constrictor at the back, the support mentioned above, over-lapped by the middle constrictor (the latter not being essentially a voice muscle), while the cheeks, lips, teeth, hard palate, palate to tongue and palate to larynx muscles form the sides and front of the space. The tongue is a large and direct agent in formation here, as it is connected directly with the upper part of the larynx. Its derangement in action being alone sufficient to utterly destroy tone, or, on the contrary, when well adjusted and hanging normally in relation to the other voice parts, it gives what is termed, the silvery quality to the voice.

The lower or "laryngeal" space is bounded by the walls of the larynx and spine, and is regulated by the movements of the muscles attaching directly to the larynx parts.

The boundaries of these hollow spaces form a connected chain of the muscle and nerve supply which, with every vocal movement, must do a certain and definite amount of work.

The will calling for speech or song sets them into action, and there must be a harmony of action throughout the whole if we would secure normal results.

The case of the growth of a node on the vocal band caused by a blow on the outside of the larynx, over the sterno-thyroid muscle, has led me to conclude that the agencies governing the hollow spaces and holding the larynx in position have not been sufficiently understood in their relation to the direct workings of the inside action of the larynx.

It has always seemed to me that the present theory of the mode of production of nodes is insufficient, as well as mysterious.

Dr. Charles H. Knight, in his article, "Vocal Nodules," read before the American Laryngological Association last May, makes the following statement: "The confusion and disagreement prevailing as regards nomenclature and pathology apply to nearly every question bearing on this subject, partly it is believed, in consequence of failure to differentiate the lesion." From observation of various cases he has arrived at the conclusion that wrong action of the extrinsic muscles and any mechanical obstacle to the emission of voice are the chief causes of such growths.

Explaining the formation of a node by the mechanical effect of an interference of the vibrating segments of the vocal cords is insufficient, because, up to the present time no definite conclusion has

been reached as to how the vocal bands vibrate for tone and overtone production, and as to what effect the action of the extrinsic muscles have upon the vocal bands.

In order to place ourselves in a proper position to study the etiology of nodes on the vocal cords it is necessary,

1. That we know the physics, the anatomy and the physiology of what is recognized as a good method of voice production.
2. The pathology of the node and of the perinodal tissue.
3. That the case under observation have a general reputation for correct singing.

I will not go into the full relation of the physical laws of the anatomy and physiology involved in voice production, that being beyond the scope of this paper, but there are certain points I wish to make because of their importance and of their direct bearing upon the subject.

(a) The hollow spaces—nasal, oral and laryngeal—are quite as important in producing the modifications and modulations of the singing voice as are the vocal cords and the intrinsic muscles of the larynx.

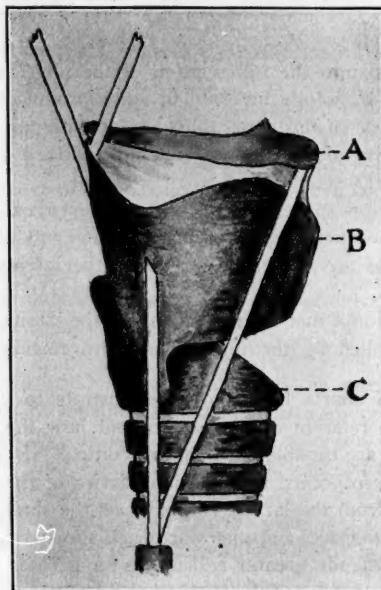
There is no doubt that the movements of the larynx depend upon and are controlled by the muscles and movements outside that organ.

By means of charts I will now demonstrate to you as clearly as possible the relation of these parts and how the principal extrinsic muscles are capable of voluntary control. Bear in mind, as I show you these points, that the boundaries of the three hollow spaces extend from the larynx to points on the skull, at the upper end of the nasal space, and that since each succeeding higher tone of the voice demands greater resistance, for greater breath pressure, there is a constant contraction of the walls of these chambers through the entire upward range of the voice, likewise a relaxation through the descending range. These muscles, as before stated, can be controlled by voluntary action. The change for each successive pitch is so slight that our senses scarcely detect it. With the establishment of correct relationship of parts, and a use of proper breath supply, the need for voluntary control ceases.

The key to efficient results seems to lie in the regulation of the hollow spaces by the control of their boundaries. We know that with this regulation comes pitch, amplification, quality, in fact all the desirable voice requisites. We, as workers on the human voice, cannot expect to eradicate difficulties, add new beauties or

produce artistic results unless we understand the mechanism of the vocal instrument. We can better prove our results by a tangible mechanical method, and in order to decide the questions of voice failure we must understand its action.

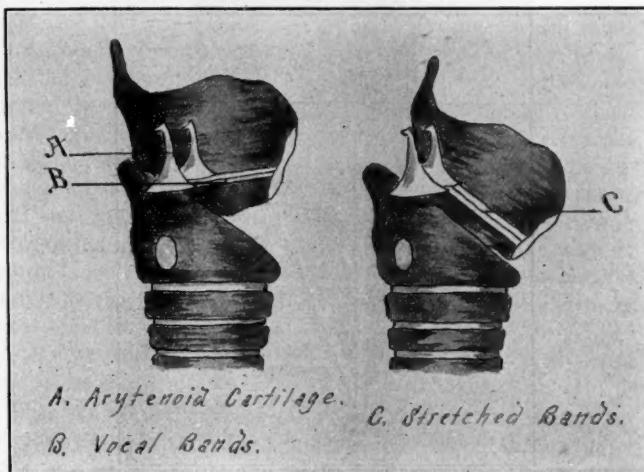
Here we take up the voice synthetically: 1. Let us look at the larynx, with its holdings. I will show you from the cut the action arising from harmonious relation of the parts.



[A. Hyoid Bone. B. Thyroid Cartilage. C. Cricoid Cartilage.]

The hyoid bone lies at the top of the larynx to which the tongue attaches above. The thyroid, or shield-shaped cartilage, below, contains the true and false vocal cords. The cricoid cartilage is below this, setting directly on the rings of the trachea. It is wide at the back and rests close to the spine, the normal position being at the fifth cervical vertebra. At this point on the spine the longus colli muscles, in which the front part of the spine is embedded divide, allowing the cricoid cartilage to lie close to the spine, giving contact with the bony frame of the body.

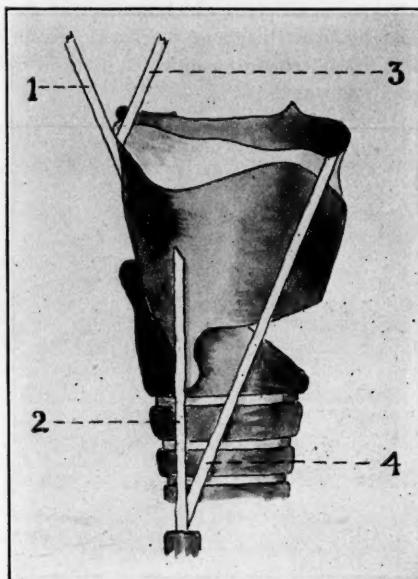
Here appears a vital point in our tone production. From transmission of laryngeal vibrations to bone we derive a great amount of tone resonance to retain which throughout the entire range of voice the cricoid cartilage must keep its position at this point. Lapping around the cricoid cartilage, and fastening into a slight socket on each side of it, passes the thyroid cartilage. Inside this, and about half way up at the angle in front, start the true vocal cords. They pass backward, a muscular shelf-like mass, growing to the sides of the thyroid cartilage, to fasten to the swinging pyramid-shaped arytenoid cartilages which are held to the upper, outer borders of the cricoid cartilage at the back. Keep well in mind that these cords are fastened to a movable point in front, and indirectly to a fixed point at the back.



The office of the arytenoid cartilages is that of swinging together at phonation and approximating the vocal cords. This action does not supply varieties of pitch, so we must look elsewhere for our adjustment of tension and stretching of the vocal bands. The stretching of the vocal bands depends upon the swinging of the thyroid cartilage forward on the cricoid cartilage, making the distance greater from the depressed front of the thyroid cartilage to the stationary arytenoid cartilages at the back. In order that regular tension may be observed throughout the range of voice

this process must go on gradually, and the point be fixed on which the thyroid cartilage swings. (See Chart same as No. 2).

From the posterior border of the thyroid cartilage passes a muscle, the stylo-pharyngeus, to the styloid process, a point on the temporal bone directly under the ear. The action of this muscle pulls the larynx up and backward; while the sterno-thyroid, from an oblique line on the side of the thyroid cartilage to the posterior surface of the sternum, or breast-bone, holds the larynx down.



Muscles of fixation: 1. Stylo-pharyngeus. 2. Sterno-thyroid.

Muscles of cord stretching: 3. Platо-pharyngeus. 4. Sterno-hyoid.

The combined action of these two forces pulls the larynx back against the spine and keeps the cricoid cartilage firmly fixed against it. Having the larynx in a fixed position, we pass to the chain of muscles which swings the thyroid cartilage on the cricoid cartilage, gradually closing the crico-thyroid niche and stretching the vocal cords for their various degrees of tension. This swinging of the thyroid cartilage changes the boundaries of the pharyngeal spaces

throughout the voice range. The palato-pharyngei muscles, extending from the upper posterior edge of the thyroid cartilage to the uvula and soft palate, pull the thyroid cartilage up and forward, the levator palati rising from the uvula to the petros bones above, continue the upward holding of palate to larynx muscles. The sterno-hyoid muscle, from the body of the hyoid bone in front, and inserted below to the inner extremity of the clavicle, sternum and first rib, pulls the anterior portion of the thyroid cartilage downward.

The combined efforts of the palato-pharyngei pulling up and forward, with the sterno-hyoid pulling down and slightly backward, swing the thyroid cartilage in its socket on the cricoid cartilage and stretch the vocal cords which lie within. (See Cut No. 4.)

We have now analyzed the actions and movements which result in the fixation of the larynx. This gives to the tone great resonance, and insures evenness and breadth of quality throughout the range of the voice. We have also analyzed cord stretching, which insures perfection of attack and spontaneity of delivery. The control of the motive power, THE BREATH, is of the utmost importance in maintaining the fixation and cord stretching of the vocal mechanism. When the breath is not properly applied, the correct action of some part or parts of the voice machine must be disturbed, with consequent trouble. The jaw and chin muscles are usually the first to become disarranged. With derangement come varied forms of faulty tone production.

The next point to require our attention is that the action of these spaces is prior to the action of the vocal bands.

While the vocal cords and the action of the larynx during exhalation (air being forced through the cords by the action of the diaphragm, other expiratory muscles and the pulmonary tissues), provide the initial forces for the proper number of vibrations per second for any given tone, and while they probably, by nervous and muscular action, influence to a great degree the beginning of the tone and overtone vibrations for its quality and timbre, yet, without the cavities being drawn into absolutely perfect spaces of the size and form required for that special tone, the production of almost any tone would be impossible.

To illustrate: If you sing the vowel "ah" on the tone of "C" and again the same vowel on the tone of "E," and if now, by will

power, you hold the tongue and all the cavities in the position necessary for the tone "E" while, with the larynx, you try to vibrate the "C" you will obtain as a result, a dismal failure—hardly even a grunt.

One more experiment which will show you after a few trials that the above stated action of the hollow spaces is the correct one.

1. Use your larynx open for breathing without making any tone whatsoever except the necessary sound of air passing.

2. Draw your cavities and hollow spaces slowly into position as if you were uttering the vowels a, e, i, o, u, (as pronounced ah, a, e, o, oo), one after the other, and do all this without any special effort.

3. Observe carefully and listen to any possible slight tone sound which may be developed while whispering the different vowels. This tone naturally would be only a whispering sound and not a loudly ejected tone.

The result will be that you find the whispered tone on e from four to six half tones higher than the tone produced on a. The whispered tone on the vowel i is again from four to six higher than the one on e.

Uttering the vowel o, you perceive the tone goes in pitch below the one of our original a, while the sound on u is very near the one of our original a. All this may vary somewhat in pitch in different people, but the absolute change in pitch of vocal sounds, when whispered without effort to hold the pitch, is true in every person.

This I hold to be proof that the three or more hollow spaces in whose changes the utterances of vowels must be based by their function of shaping these spaces, produce a change of pitch without any action on the laryngeal part, and therefore as a necessary result, the different changes in our hollow spaces must force laryngeal action to conform with any pitch started in such of the hollow spaces as may be in action for tone or articulation.

The perfect action of these hollow spaces requires the proper co-ordination of the extrinsic muscles of the larynx. In order that the muscles regulating the boundaries of the hollow spaces may properly perform their function through the range of the voice, the larynx must first be fixed.

The separation of the longus colli muscles permits the cricoid cartilage to rest close to the spine at the level of the fifth cervical vertebra.

The stylo-pharyngei, passing from the posterior border of the thyroid cartilage to the styloid process of the temporal bone, holds the larynx up and back, while the sterno-thyroid, going from the oblique line on the ala of the thyroid cartilage to the posterior surface of the sternum holds the larynx down.

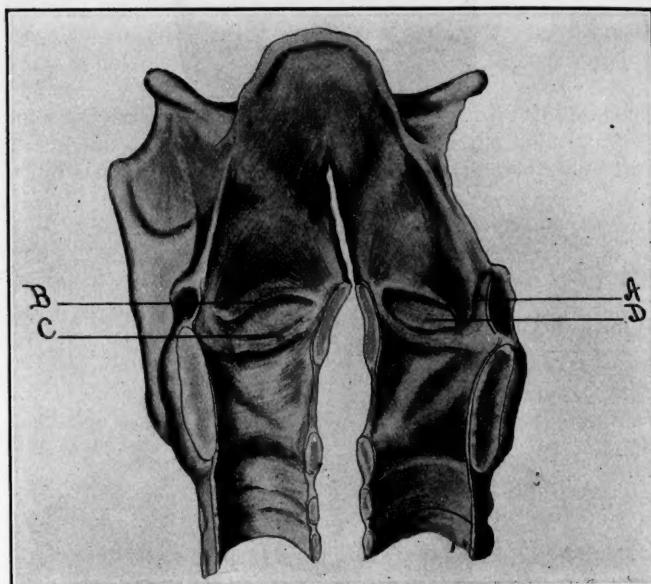
The combined action of these muscles fixes the larynx at the



point above mentioned—opposite the fifth cervical vertebra. From this combination of muscular force and position is derived the greatest possible chance for amplification and resonance of the voice, for the vibrations are transmitted to the bony framework of the body.

From the lowest pitch of the voice, preparation is made by the muscles for cord stretching, the swinging of the thyroid cartilage, which gradually closes the crico-thyroid niche. At F, as a rule,

(first space treble cleft; one octave lower in male voice), the cartilage begins to move downward. At F above, laryngoscopic observation shows a sudden dipping downward of the arytenoid cartilages at the vocal cord attachment, and consequent lengthening of the vocal cords. This holds and continues together with increased intrinsic effect. At the high F the crico-thyroid niche is closed and cord stretching has reached its limit. The tones above this F are then produced by increased tension on the larynx holding

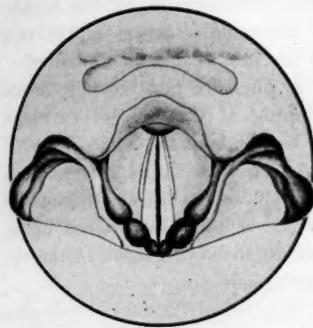


A. Arytenoid Cartilage.
B. False Vocal Cord.

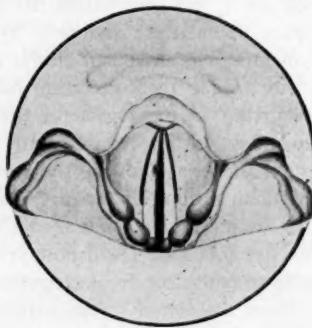
C. True Vocal Cord.
D. Ventricle.

muscles, and also increased tension of the inner larynx muscles, to overcome the greater breath pressure demanded in producing the higher voice. By the increased action of the intrinsic muscles, the vocal cords are gradually thinned throughout their entire length, giving narrower vibrating edges for each succeeding higher tone, similar to those used in the violin. (Chart 12.)

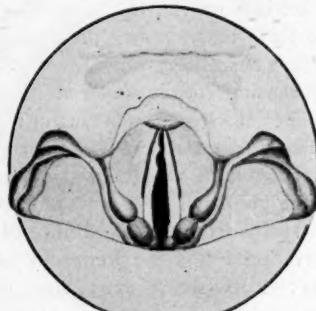
I trust I have made it clear to you that from the lowest to the highest point in the voice there is a gradual closing in action tak-



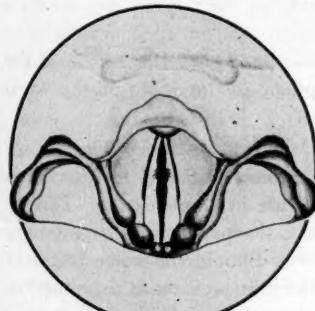
Cut 8. Normal condition of vocal cords.



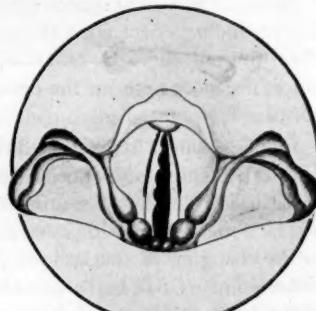
Cut 9. Singer's node.



Cut. 10. Double Unilateral Node.



Cut 11. Double Bilateral Node.

Cut. 12. F sharp, C sharp, B flat and
G sharp Nodes.

ing place, not only inside the larynx, but throughout the hollow space boundaries; and only by a harmonious action of the two (intrinsic and extrinsic) efforts can the best results be obtained.

On raising the voice from pitch to pitch we find the first break occurring in the region of the dipping of the thyroid cartilage downward at F, consequently I use the scale from E to F sharp above, as showing the most glaring voice faults, always finding them within this range. This fact shows that unless the middle or cord-stretching portion of the voice is normally entered upon, disaster follows. I will now proceed to show you some of the results of faulty condition, together with their causes.

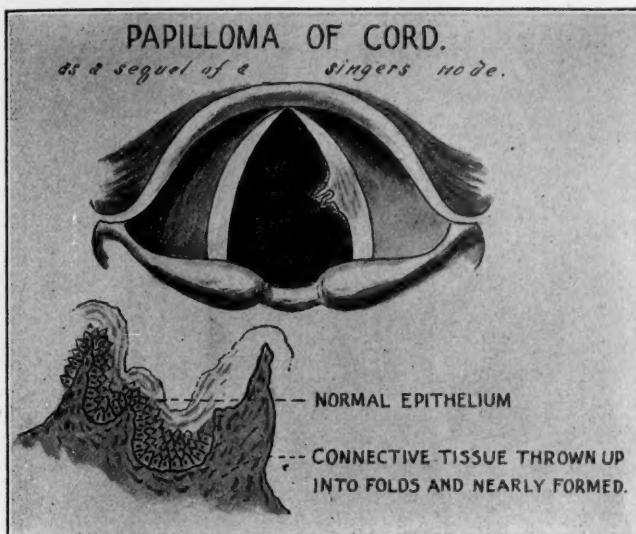
Since the action of the extrinsic muscles of the larynx governs the production of the scale in the middle and most useful part of the voice, from E to F sharp, just where we find nodules or inflammatory swellings excited on normal tissues, any failure of harmonious action of these muscles may produce nodes on the part of the vocal bands which these muscles control. I have seen nodules occurring, causing vocal collapse at F sharp and C sharp, B flat, G sharp. The muscles and mucous membrane of the hollow spaces seem first to be affected, and their sicknesses are reflected to the vocal bands in a peculiarly unique and systematic manner, enabling the physician to locate some of the troubles in the singer's hollow spaces from the appearance of the vocal bands.

From this observation I find the frequency of nodes to be in the following order: (1) C sharp; (2) G sharp; (3) F sharp; (4) B flat. These keep a relative position in ascending the scale, showing that the tension and increased muscular energy that is brought to bear in the hollow spaces while singing the upper tones create a corresponding effect upon the vocal cords, from their arytenoid to their thyroid end. In other words, the higher the break in the voice, the more anterior the development of the nodes on the vocal cords.

In diagnosing I have adopted the following method. The patient is to take a position opposite the examiner. The E to F' scale is to be used, the patient singing the scale in single notes. This, it will be noticed, brings in G sharp and C sharp, which are vital points in the changing of the hollow spaces. Should the voice break at either point we will know whether the injury exists at the junction of the tongue with the pharynx, or with the epiglottis; or whether this has been severe enough to cause a node at G sharp. By this

break I mean, in a cultivated singer, the perceptible change of voice is the timbre. I do not mean a change in the register of the voice. Should the break be at C sharp I believe there is a possibility of some injury in the region of the soft palate, in the pillars of the pharynx, at the base of the tongue or some follicular enlargement which interferes with the reflexes in the posterior walls of the pharynx.

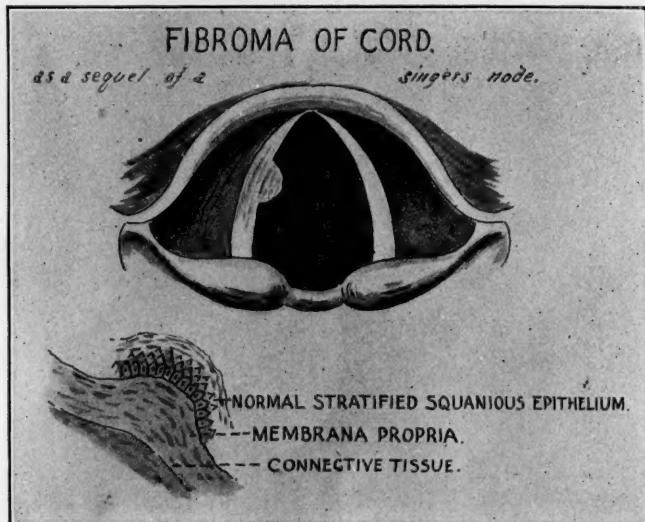
Should there be a blowing or gasping sound down the scale between G' sharp and E, I look for thickening of the arytenoid or inter-arytenoid spaces. Should this be a high voice I try it on the



G sharp scale, and should the voice be unable to reach the position on the scale above G' sharp, then there is some difficulty with the pharynx—perhaps a post-nasal growth or secretion which has interfered with the muscles of the soft palate. Should the quality of the high G' sharp be forced, then the patient should be directed to sing through the nose, and if there be any inability to produce nasality, by pinching the nose to get the interruption of sound, we know that there is some growth, or some constriction of the cavity or calibre of the nares interfering with the auxiliary hollow spaces of the nasal cavity.

To resume, disturbances in the higher resonator chamber, (nasal cavity), reflect themselves on the anterior part of the vocal cords. A lack of proper use of the post-nasal cavity will cause irritation or nodes, and if they be produced, they will occur on the anterior portion of the cord.

Disturbances in the middle, or oral, hollow space reflect upon the middle of the cord. In the lowest hollow space the same principle exists to create disturbances in the posterior ends of the cords, especially if anything interferes with the normal position of the larynx on the spinal column.

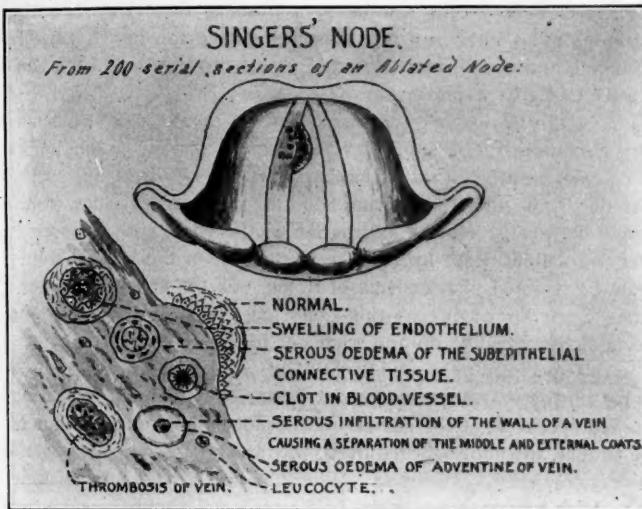


In arriving at the cause of nodes and nodules it is necessary to study the injury to the vocal bands microscopically so as to get at the nature of these injuries. In every case it is found to be from trauma, or mechanical injury and not the result of a disease. Consequently the injury is a reflected one, inasmuch as it does not arise from inflammatory condition of their own tissues. This is stated because many authorities assert that nodes of all kinds are of tubercular origin.

Dr. John Larkin's pathological study (worked out under my suggestion), shows that these conditions are nothing but inflammatory swellings excited on normal tissue, which should never be

removed, because, following the laws of inflammation, they can be absorbed without any change to the tissue involved. (Cut 15.)

In the case of a node removed and given to Dr. Larkin, the following report is given: Serial sections were made, in all about two hundred, and stained in various ways. The epithelial covering of the vocal cord is perfectly normal, and shows no separation from the underlying tissues. The superficial strata of the epithelium is, however, a little compact, possibly made so by constant and severe



use. The most noteworthy features are to be found in the submucous tissue of the cord proper. Here the tissues are widely separated by what appears as a fluid oedema, a few, but not many leucocytes, fibrin, in compact masses here and there, mostly at the base of the section. The examination of the blood vessels in this section is most important and noteworthy, and the changes found will be described briefly.

1. In the smaller veins the endothelial lining is exceedingly rough; the cells are swollen, some free in the lumen. The protoplasm granular and some places not staining; in others, having small particles of fibrin and leucocytes hanging to the highest part.
2. Many of these veins are partially occluded by parietal throm-

bi, as yet unorganized, and composed of fibrin and leucocytes in the mesh.

3. In other veins the thrombosis is more marked. The lumen is twisted and tortuous and the adventissue coats of the vessel are swollen with oedematous fluid.

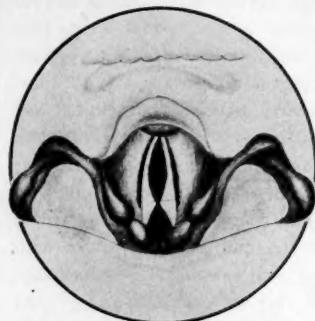
4. In still other vessels the lumen is entirely occluded by fibrinous thrombi, and it is here that one can make out a very early phase of the organization of the thrombus; small, round and slightly elongated cells can be seen pushing their way into the fibrinous nidus until in a few vessels we have the lumen entirely occluded, and the fibrinous thrombi now being replaced by a connective tissue hyperplasia.

Under the microscope one would not call this a true inflammatory condition. It is a process that has necessarily taken weeks to complete, but even the fact that we have nodes here due to the thrombosis of smaller veins, and resulting oedema of tissues, would hardly be a cause for the extirpation of the vocal cord. There is every probability that by rest the circulation of the vessels would again be restored, that oedema of tissues subside and functions return. Such knowledge as this must aid greatly in teaching the laryngologist what to do and what not to do.

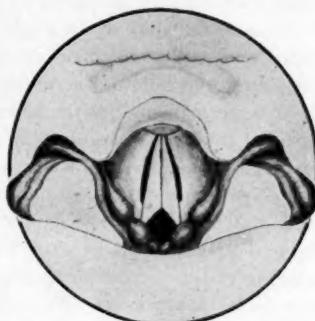
In this specimen presented by Dr. Larkin, the singer was advised by myself the year before not to have the node ablated, but visiting a noted specialist, at the advice of a friend, without the consent of the patient, the node was removed, with the result that the singer's voice is now entirely changed. Where he had a deep, fine baritone voice, with a range from A flat below to A flat above, he now can sing only from C to E, and the voice quality very much impaired. He has been compelled to resign his position in consequence.

Another examination given by Dr. E. E. Smith, shows the node specimen as a small bit of tissue of irregular shape, scarcely $1\frac{1}{2}$ millimetres in longest diameter. Sections of the growth reveal a superficial layer of stratified, squamous epithelia covering the entire surface and extending to an average depth of one-tenth of a millimetre. It is impossible to distinguish any definite basement membrane. The stroma immediately underlying, is a fibrous connective tissue which, in the centre, is largely replaced by bundles of elastic tissue. The specimen presents, therefore, much the same appearance as the true vocal cords, and is to be regarded as a simple hyperplastic growth. This young lady, a high soprano,

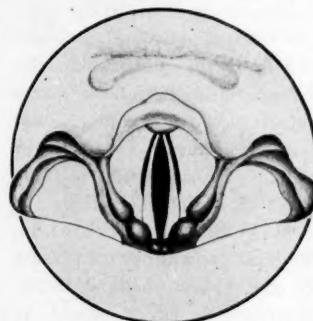
where the node was very small, about the size of a pin's head, was removed by myself with the result that her voice, which was breaking at C sharp constantly, was restored for the period of an hour after its removal; but the next day she was voiceless, and remained so for two weeks. At the end of a month her voice was in very good condition, and at the end of three months was absolutely restored and better than ever before.



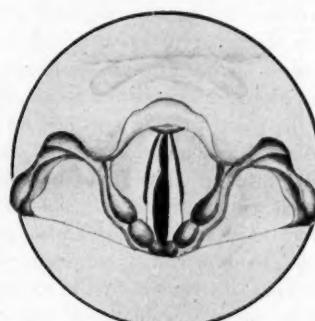
Cut 16. Paralysis of the Thyo-Arytenoids and Arytenoids.



Cut 17. Paralysis of the Arytenoids



Cut 18. Paralysis of the Thyo-Arytenoids.



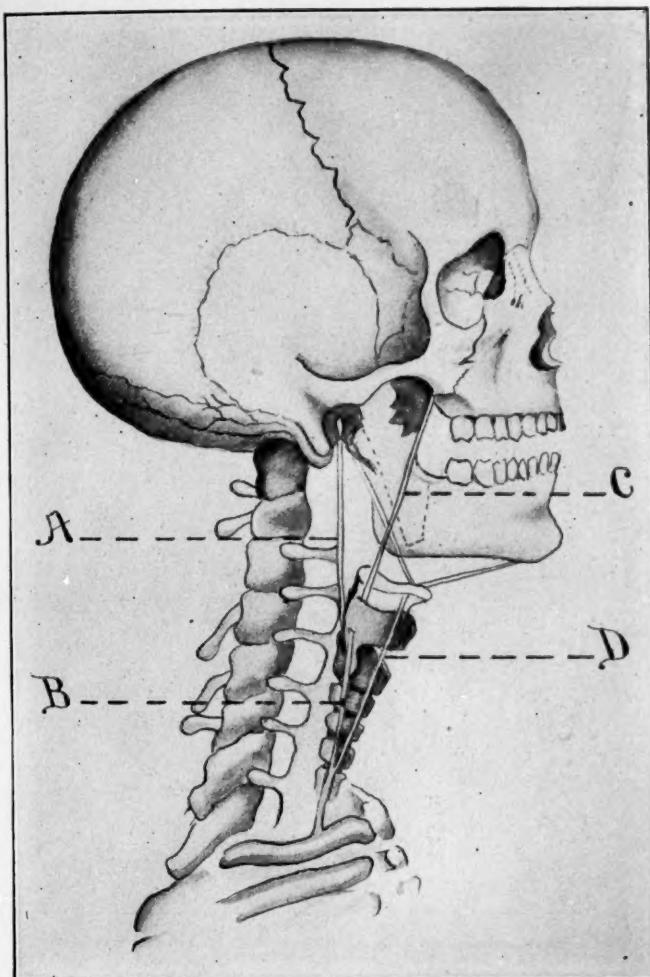
Cut 19. Paralysis of the Right Thyo-Arytenoid as a sequel of a Node.

A scheme of the pathology of a nodule from a vocal cord resulting from the study of 200 serial sections of a large organized node of a year's growth.

While observing the clear-cut picture presented by an arytenoid paralysis, I was reminded of some conditions which arise from the position of the cord, due to nodes where a similar condition ex-

isted at the thyroid end of the cord. It is this condition which has induced me to believe that extrinsic muscles exert their influence upon the cord and that it assumes this paralytic look due to some weakness of the extrinsic muscles. In other words, the force exerted by these muscles has changed the centre of resistance, raphe (if you choose to term it), at its centre, or as I am accustomed to term the centres of mechanical resistance on the vocal cords. For instance, in paralysis of the arytenoideus this point will be found at the apex of the angle formed by the border of the paralyzed cord. These centres of mechanical resistance always show thickening and bulging, if the paralysis is temporary. If the paralysis is permanent, the thickenings are absorbed, atrophied, and the point rounded off. As vocal nodules occur at other points than can be explained by paralysis of the intrinsic muscles, we must look elsewhere for the explanation of their appearance. When we study the location of the hollow spaces and their division by a chain of muscles that produce cord stretching and fixation, with swinging of the thyroid cartilage for about one octave, we see that the muscles in action are all extrinsic, and not intrinsic, and govern the voice throughout its range, causing the intrinsic muscles to become adjusters of the cords and regulators of the different air currents that pass through the glottis, producing through the position of the larynx upon the spine, a wonderful power of amplification of sound, also of doubling currents at the glottis, whereby the means are furnished to double vibrations in the hollow spaces of the voice, causing a wonderful production of tones, phenomenal for pitch and power, as well as for subtle quality. From this, it will be seen that we must have a standard of production of tone, which will satisfy the physiological laws of voice production. In order to clearly understand the physical derangements which I am going to show you, as productive of nodular growth, let me present the vocal instrument first in its normal and correct position; its position on the spine, with the cord-stretching effect caused by swinging the thyroid on the cricoid. From the styloid process under the ear to the upper horn of the thyroid cartilage pass the stylo-pharyngei muscles. Opposing these in action are the sternothyroid muscles, from the side of thyroid cartilage to the sternum. The action of these two muscles, one drawing up and back to the ear, the other down to the sternum, tends to pull the larynx back against the spine. When this function is correctly established, the

larynx lies at the fifth cervical vertebra where nature has provided a place of repose, by separating the longus colli muscles at this

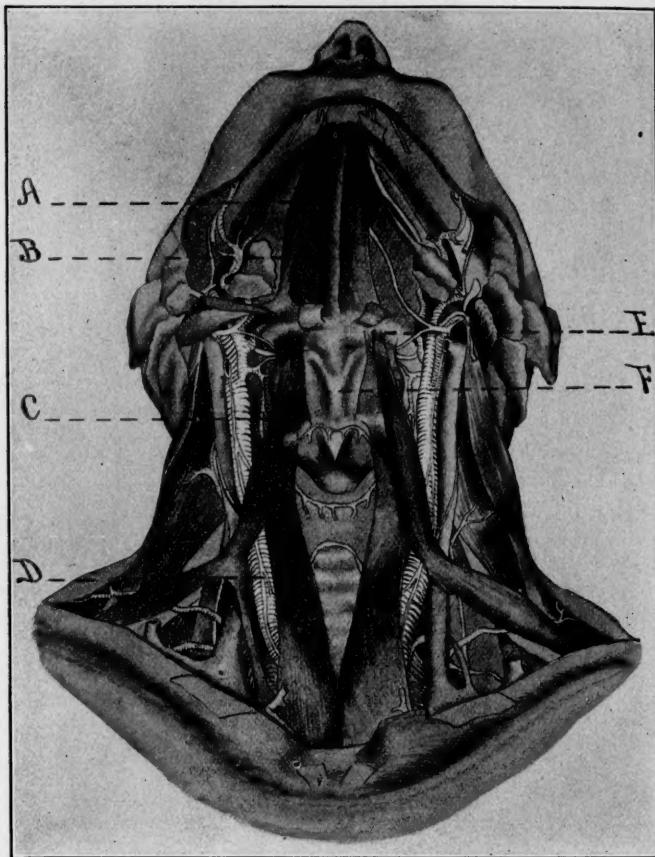


A: Stylo-Pharyngeus Muscle.
B: Sterno-Thyroid Muscle.

C: Palato Pharyngeus Muscle.
D: Sterno-Hyoid Muscle.

point. From the close contact of vibrating larynx with the bony

frame of the body we derive the finest tone resonance, the larynx being fixed by the efforts of these two pairs of muscles. I will now show you the action of cord stretching. From the upper horn of the thyroid cartilage to the points about the uvula pass the palato



A. Digastric-Hyoid bone to chin muscle. D. Sterno-Hyoid from Hyoid bone to sternum.
 B. Mylo-Hyoid bone to chin muscle. E. Hyoid Bone.
 C. Omo-Hyoid from Hyoid Bone to shoulder. F. Thyroid Cartilage.

pharyngei muscles which, in turn, are held up by the levator palati to the petrous bones on the skull above. Opposed to these upward and forward-pulling muscles we have the sterno-hyoid pulling down

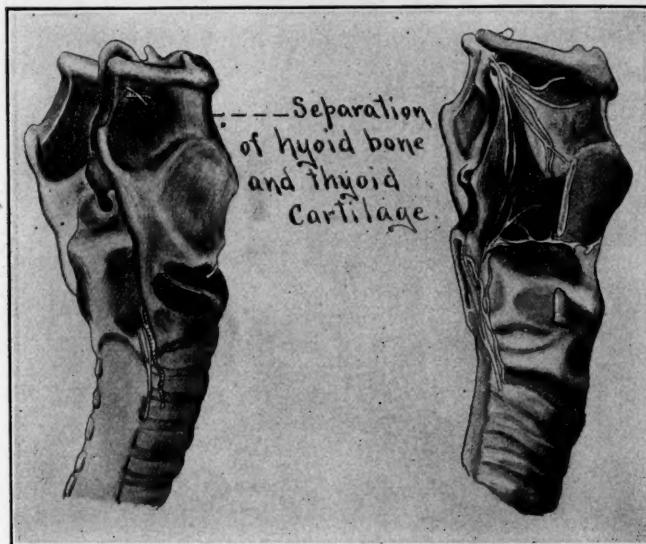
to its fixed end at the sternum, swinging the thyroid cartilage forward on its socket on the cricoid, thus stretching the vocal cords which are fastened to the angle of the thyroid cartilage in front



and indirectly, through the arytenoid cartilages to the cricoid cartilage at the back. This swinging of the thyroid cartilage takes place through one octave of the voice, for the stretching of the

vocal cords. Node formation is found to occur within this octave. Bear in mind that fixation and cord-stretching are the normal efforts through the whole of the voice range, and everything interfering in any way with this action causes derangement in tone formation.

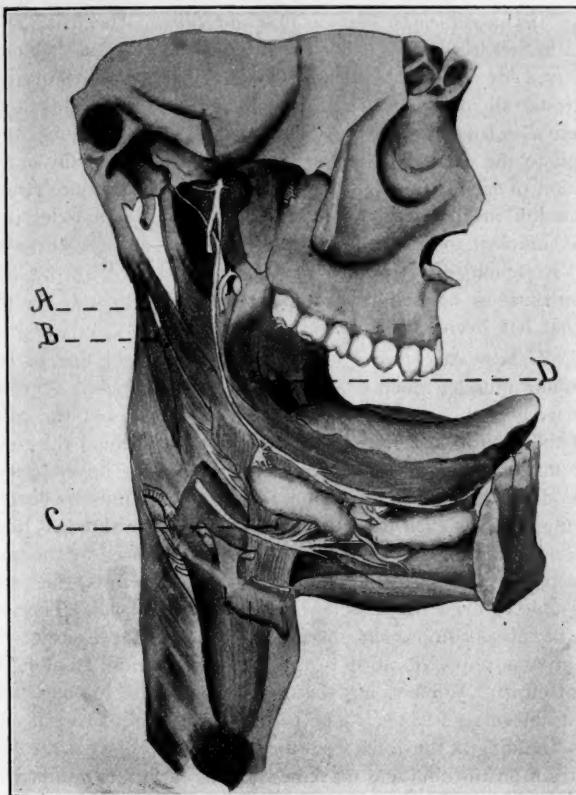
I find in the cases to be presented for your inspection, that any variation of action of certain extrinsic muscles of the larynx, disarranging this fixation and cord-stretching, is alone responsible for these growths. In the two cases I have shown you we find all the



layers of chin to hyoid bone muscles over-exerted, thus drawing the hyoid bone forward and forcing the larynx from its normal position at the fifth cervical vertebra of the spine. In one of these cases the hyoid bone is pulled from the thyroid cartilage, while, in the other, the jaw is pushed forward from its place in the socket, forcing the whole vocal instrument forward.

The tongue becoming hard, and either raised too high or lowered at the back, stops the possibility of proper cord-stretching by interfering with the action of the palato-pharyngei muscles. Tones thus produced are held to a certain point in the scale by these interferences, when a change of action takes place. At this point of

change we find the break in the voice and node formation. Faulty action of this kind is so apparent, that one accustomed to note normal conditions is immediately struck by the swelling and hardness of the muscles of the chin, also the throaty tone produced, both in speech and song. A remedy for these conditions in the



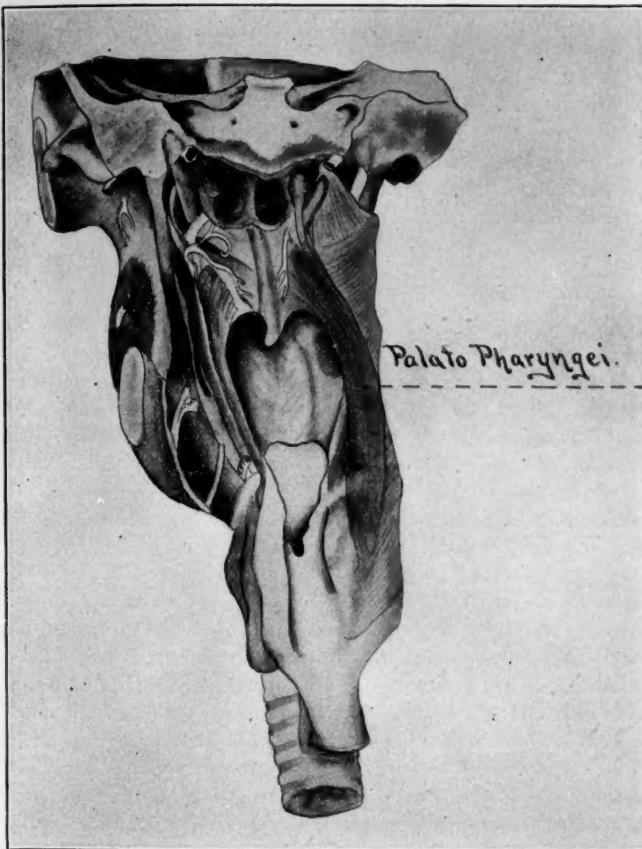
A. Stylo-Glossus,—tongue to ear.
 B. Stylo-Pharyngeus,—tongue to hyoid bone.
 C. Hyo-Glossus,—tongue to hyoid bone.
 D. Palato-Glossus,—tongue to palate.

singing voice has been suggested by Dr. Holbrook Curtis, consisting in depressing the chin upon the sternum using supra costal respiration, focusing the tone in the masque while with poose lips the syllable *me*, (pronounced *maw*), is lightly sung on various

pitches of the scale, empirically this exercise has many times given relief. To my mind and experience, I find prompt relief and rapid restoration in proper and vigorous massage of the strained parts. The massage is given thus: The fingers are oiled to prevent hurting the skin and drawn rapidly from the center of the lower jaw-bone backward across the chin muscles to the hyoid bone, keeping as well as possible the line of muscular fibre. The usual efforts given in Swedish massage, boring, straight rubbing and shaking are employed for the purpose of stretching, relaxing and restoring circulation to the over-contracted parts. The same method is used on the muscles from the larynx to the sternum and clavicle, also from larynx to the ear. This treatment should be given daily and the duration of each sitting should be long enough to produce renewed circulation in the parts. Relaxation of the chin muscles is not alone sufficient to allow the larynx to drop to its normal position. Cord-stretching efforts which have been weakened by this faulty action must be re-established and strengthened, to take the place of what has been abnormal.

In all these cases we find the palato-pharyngei line of cord-stretching muscles much relaxed and almost in disuse. To restore these we give such an exercise as the following: Let the patient open the mouth, and watch the palate muscles behind the tongue as he makes a sound as if to expel mucus from the upper pharynx. Note, at the moment of the sound, that the palate muscles contract, drawing towards each other from the sides of the throat. Repeat this many times. Voluntary control is soon acquired by the power of dropping all breathy noise in producing the effort, the patient being able to draw the muscles back and forth at will. Then hold them in this position while singing the tones of the E scale. The patient soon notes vibration during tone production, all along this line of effort. While doing this the jaw and chin muscles should be left absolutely relaxed. The patient soon feels a sense of security and holding of the voice from the larynx to the soft palate, while the strain on the chin and movement of the larynx is gradually reduced. If deemed more practicable, these simple exercises, equivalent to throat gymnastics, may be given with no tone production whatever, and most desirable results obtained in an incredibly short space of time. Of course, where one is studying for the singing voice the new sense of tone effort which arises from the change of action is most desirable, and it is probably best to sing

the new effort into action as soon as possible. You readily see that the strong use of the palato-pharyngei muscles puts the effort of tone on a legitimate line of action, thus freeing the over-strained



chin and larynx muscles. This also allows the larynx to fall back and to be gradually restored to its normal condition, the jaw and chin muscles becoming relaxed and resuming their proper functions. The jaw and chin muscles are aids in voice support, and take up and carry on a certain amount of vibration, but they are not direct voice functions. Since they are not, they should not be

used as producers of tone. With the relaxation of the chin muscles the tongue is gradually relieved of strain, and proper exercises should be given for restoring it to its normal place in the mouth, high over the teeth and loose. If we find the tongue too low (as in one of the cases before you), simple exercises are given, as the following for restoring it to its balance between its four points of attachment, palate, ear, chin and hyoid bone.

When the tongue is too low (see cut 24), as in the case spoken of, it forces down the back of the hyoid bone, thus destroying any tendency of the upward pulling of the palato-pharyngei muscles to proper cord-stretching. Therefore, we must keep the tongue high in the mouth. For lowered tongue place the finger lightly upon the middle of the tongue far back, whisper the sound of "A," learn the feeling of the high tongue and gradually make this a voluntary control, singing light tones through the middle part of the voice. Lurch the tongue upward and forward so that it lightly touches the finger. Place the finger at either side of the tongue, produce the same effort; note that the sides of the tongue move forward, as well as the middle. If the side tongue muscles are shortened in drawing backward with the lowered tongue, take the tip of the tongue between the thumb and finger, draw gently from the mouth with each tone produced, until these muscles become stretched to their normal position with the production of every tone. Note whether the lower fibres of the tongue forming the floor of the mouth be lowered below normal position. If so, raise the tongue in front, place the finger just inside the lower teeth against the lower tongue muscles and lurch them gently up against the finger. Train them so, until they keep their normal place, high in the front part of the mouth. Where the tongue has become high and hardened, as in the other case I show you, exercises for the relaxation of the tongue should be given, spreading it over the back teeth, and thrusting it loosely forward its whole length during the tone production. Then draw it gradually and loosely back and forth in the mouth, lowering it slowly until it will resume a normal position just above the lower teeth.

When the tongue is too high and too far back, with hardened fibres, it cuts off the length of the palato-pharyngei muscles, stopping cord-stretching. Faulty enunciation arises from these forced positions of the tongue. By simple means it is rapidly restored and the whole vocal mechanism relieved of strain.

Many voices used in these improper ways will withstand hard strain for some years, and suddenly, at some unwonted or prolonged effort, break and form the nodes.

I find quick and rapid restoration in every case where the proper mental picture of the vocal effort is given to the patient, with a consequent relaxation of the over-exerted parts and strengthening of the normal voice supports.

Between January and June of the present year fifty-two cases of cordal disorder were treated successfully according to the ideas herein suggested. The majority of the cases showed node formation, one patient having a recurrence of double nodes three times in six months previous to beginning this course of treatment. The case referred to was that of a singer. Two weeks before her debut concert, having prepared a very heavy program, her voice failed her. After eleven treatments she went through the concert with no noticeable trouble.

Another singer was carried successfully through an evening, having a case of paralysis, the number of treatments previous to singing being ten. One case showed loss of voice of five years' standing, and another of twenty years. Both proved most interesting. The first named found tone restored at the end of six treatments, while the other could carry on an easy conversational tone, and read aloud at the end of fifteen treatments.

In no case has there been failure to produce rapid and permanent results, and I am confident that the remedy has been reached whereby all such conditions of voice failure can be relieved.

In conclusion I take pleasure in presenting this to you for your inspection, criticism and discussion, and hope it may prove as interesting to you as it has to me. I am greatly indebted to the four patients and two able assistants who have been so kind as to accompany me here, and lend their services for our common good. Miss Emma A. Dambmann, Miss Ethel Parks, Miss Hilda C. Paulson and Mr. Emmet DeVoy are all singers of recognized reputation, who have suffered voice difficulties of the character above described. I am also very grateful to Mr. Charles A. Rice, vocal teacher, who has made the sketches for this work, and some fifty lantern slides to fully illustrate the lecture, while Miss Dora Louise Topping gave the muscular exercises and tone work for the restoration of the voices.

22 West 31st St., New York, N. Y.

BENIGN TUMORS OF THE NASO-PHARYNX.*

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Notwithstanding the great number of cases of these growths reported singly or in small groups, there is probably no subject in medicine of such importance in which there is such a dearth of collective investigation. Since the study of these tumors by Beusch, in 1878, in which this author attempted to collect and tabulate the case histories to date, it is very doubtful if there has been a single earnest endeavor in this direction. The reason is not far to seek, for the term "naso-pharyngeal growth" includes a great variety of neoplasms of every degree of clinical importance, and while these growths may agree in occupying the naso-pharyngeal space, they present such differences in point of origin, texture, vascularity, tendency to recur, frequency, etc., etc., that a joint study would produce results which would not only be devoid of any permanent scientific value, but which would give rise to extreme confusion, especially in regard to the indications for treatment.

The first step in the rational discussion of these growths is a classification, and it is the absence of this fundamental requisite which is responsible for the abortive state of our present knowledge of the subject.

It is true that most authors separate the so-called typical fibroma of the naso-pharynx from all other growths which occur in this locality, and recognize it as the most important of these neoplasms. But a corresponding effort has not been bestowed upon the numerous other varieties of tumor, and it is self-evident that the entire subject must be considered in a uniform manner.

If the arrangement of these tumors, as proposed by Gerber, of Konigsberg, (Kurt Schreiber. "Über die Geschwülste des Nasenrachenraumes," Inaugural Dissertation, Konigsberg, 1896), were in general use, our knowledge of this subject would doubtless be enlarged. This classification appears to have been devised after an analysis of a large number of cases of tumor of the pharyngeal

*Read by Title before Section on Laryngology and Otology, A. M. A., Saratoga, June, 1902.

vault, and is free from theoretical considerations. Some such arrangement is doubtless destined to come into general use at no distant day.

The first step is the distinction between true and false nasopharyngeal tumors. The latter, which should be considered first, comprise all neoplasms which, originating outside of the naso-pharynx, project into it secondarily. Four varieties are recognized, namely: 1. Hypertrophied posterior turbinates. 2. So-called retro-nasal mucous polypi which grow from the nasal fossae into the nasopharyngeal space. 3. Tumors (adenoma and sarcoma) which grow from the posterior surface of the soft palate. 4. Tumors (sarcoma, etc.), which originate in the cervical vertebrae. The most important member of this group is the retro-nasal polypus, which as it originates in the posterior portion of the nasal fossae—and even frequently from the choanal margin itself—is with difficulty distinguished at times from the true nasopharyngeal growth. In fact, genuine hybrids exist in which the characters of the nasal and nasopharyngeal growths occur side by side in the same tumor. When the growth originates from a choanal margin and is of a more firm consistence than the ordinary soft nasal polypus it should be ranked as of partly nasopharyngeal origin.

Coming to the genuine nasopharyngeal tumors, the most conspicuous member of this group, as already stated, is the typical nasopharyngeal polypus. This tumor is generally described as originating from the basilar process of the sphenoid, the upper cervical vertebrae or the internal plate of the pterygoid process—in other words—from some portion of the vault of the naso-pharynx. But growths in every way similar sometimes originate laterally. In Schreiber's dissection the latter are termed extrapharyngeal nasopharyngeal polypi, to distinguish them from the first type. The characters of these typical fibroids are well known. While histologically benign, they are clinically malignant from the tendency to recur. They tend to afflict youthful males. Their broad area of insertion is responsible for the numerous radical operations devised for their extirpation as well as for the many ingenious methods of attacking them through the natural passages.

There is, however, another type of nasopharyngeal fibroid which agrees with the preceding in originating from the base of the skull and affecting young males by preference, but which differs radically from it in becoming stationary after a certain size is attained. It

is also likely that the tendency to recurrence is much less marked. These growths are styled atypical, stationary or benign fibroids.

Next in order may be mentioned the fibro-mucous growths originating from the choanal margin, which we have already discussed.

The remaining varieties of true nasopharyngeal growths are all excessively rare. They comprise enchondroma, sarcoma, carcinoma, and a sort of dermoid tumor.

Let us now study the case reports and teachings of the past few years with the assistance of the preceding classification. Of the numerous clinical reports, many are not available for study because of the absence of details which would give information as to the precise character of the growth. The use of the term angioma, by a number of the reporters is to be condemned; for while differences exist in the vascularity of fibroids, a true angioma in this locality is not recognized by pathologists. The term adenoma applied to certain mucous polypi which contain glandular tissue is also confusing. The ill consequences which arise from failure to classify the tumors in this locality are apparent at every step. Writers often speak of the growths as either sessile or pedunculated, as if this matter were largely an accident or a matter of individual variation. But as the fibroid naturally possesses a broad base, while the mucous or transition form of tumor which arises within the nasal fossae, or at the choanal margin grows from a small pedicle, the difference is seen to be one of fundamental importance. If the casual operator remove a large growth of this latter type with some simple device he is very prone to rush into print. The great size of this type of growth and the attendant deformity and the ease with which the condition is remedied impress the operator with the belief that he has done something out of the common. These cases also lend themselves readily to pictorial representation, for the mass may often be seen filling the pharynx; and again, the cleanliness with which the growth may be taken out by reason of its pedicle makes it an excellent pathological specimen. Not only does the general practitioner or budding specialist report cases of this type, but eminent authorities are not free from the practice, and literature abounds in such reports. It is difficult to understand how science is a gainer by reporting such material.

These cases cannot for a moment be grouped with the sessile type of true nasopharyngeal tumor where the tendency to rapid recurrence in spite of all treatment acts as a damper to publica-

tion. It is doubtful if the ultimate fate of ten per cent of such cases after operation could be determined from literature, and we know of no medical subject where such a degree of silence prevails.

The innumerable procedures for the removal of these typical growths must all be regarded as merely palliative operations until it can be shown that recurrence has not taken place over a given period.

Until the different varieties of nasopharyngeal growths are considered separately so that statistical material of each sort can accumulate, and cases be traced after operation, and consideration of this subject must necessarily be imperfect.

ETIOLOGY AND PATHOLOGY.—DERMOID POLYPI.

Under the head of etiology and pathology not much has been added to our previous knowledge during the past few years. Two studies of dermoid polypi may be cited as active contributions under these headings, and we append abstracts of them, as follows:

Texier, V. (Presse Med., 1900, II, 395. *Polypes dermoides du Pharynx.*), concludes that these tumors are rare, 19 cases only being found in literature up to 1900. These growths arise from an anomaly of development of the pharynx, by a prolongation of the branchial arches into the pharynx. They are in the form of a polypus, which may have a long or short pedicle, gray or red in color, size of a cherry upward, ovoid, regular in shape, of firm consistence, and may contain cartilage. They are inserted on the walls of the naso-pharynx, soft palate, base of apophysis of the pterygoid. The insertion is hard to find. The symptoms caused may be cough, vomiting, suffocation when low down. The tumors grow slowly, the pedicles elongate. The only treatment is immediate extirpation.

Case. Child three months old when tumor first appeared in a fit of coughing, in the mouth. By depressing the tongue firmly the tumor could be seen when not projected, lying on the posterior wall of the pharynx, occupying the right half of the pharynx; after being thrown forward it is drawn in by swallowing motions. It passes out of the mouth 3 cm. when drawn forward, has a pedicle 4-5 cm. long, firm to the touch. The insertion cannot be seen but seems to be in the upper pharynx. Removed by snare.

Examination. Tumor is covered with epidermis containing follicles in abundance. The epidermis is of variable thickness and rests on irregular papillae arranged without order. The derma con-

sists of alveoli separated by connective tissue fibres, and containing large cells. The hair follicles are numerous, and the sebaceous glands connected with them are very small; and more or less altered. Erectile fibres are numerous, and very large. Sweat glands are much developed, form large and irregular masses, with epithelium much proliferated. Numerous blood vessels. Pedicle consists of a large artery and vein, surrounded by bundles of striped muscle fibres and with nerve elements without myeline.

A further account of these growths is given by Lecloux. (Bull. Lar., Otol., Rhinol., Mrch 30, 1901. *Dermoid Polypi of Pharynx.*) According to this author, these are structures of special development and particular form. They are pedunculated, solitary and never exceed the size of the thumb; they are covered with a cutaneous envelope of epidermis. The center is of cellular tissue enclosing vessels, and is developed from the branchial arches. We may suppose the development is in this way: a large part of the branchial pocket is covered by ectodermic membrane; at the niveau of one of the clefts a portion of mesoderm develops in an abnormal way and grows, surrounded by a cutaneous envelope, toward the interior of the throat. The point of insertion is in the niveau of the Eustachian tube, or the posterior aspect of the velum. They are gray white to red, firm, with harder spots for the cartilage.

CASE REPORTS, CLINICAL FEATURES, ETC.

In a paper of Halasz (Wien. Med. Woch., 1902, No. 42), Beusch's old division of cases into true and false polypi is maintained without any further subdivision. In Beusch's original tabulation (188) there were 69 true and 25 pseudo-polypi. Until some such scientific arrangement as Schreiber's is adopted this crude division must be relied upon to some extent in analyzing material.

The cases reported recently appear to incline decidedly to the pseudo-polypus in type. Thus Lichwicz (Arch. Intern. de Laryngol., Vol. XI., reports a series of 7 growths with their pedicles arising from the neighborhood of the choanal margins and Downie (Glasgow Med. Journ., 1901, LV. 365), enumerates 16 simple mucous polypi, growing into the naso-pharynx; 4 fibroid-mucous growths originating in the vicinity of the choanal margin, and but one typical fibroma of the pharyngeal vault.

It would be a simple matter to reckon up from the case reports of the past three years as many as 50 examples of pseudo-polypi growing from within the nasal fossae or at the choanal margins.

Such growths are readily recognized even from imperfect descriptions. Much more trouble is encountered in fixing the status of the true polypi both as to exact seat and composition, and much of the material published is unsuited for analysis. Powell (Journ. Laryngol., 1900, XV), mentions a growth which originated from the body of the sphenoid, but as he describes it as a myxofibroma it was doubtless of transitional origin. Shafer reports a series of five cases of naso-pharyngeal growths operated upon by himself (Monat. f. Ohrenheilk., XXXV, p. 507), but details are not furnished. Downie, as already mentioned, cites one case of a tumor growing from the pharyngeal vault, and Rice, after mention of a simial case, states that he has seen but three such growths. Delie (Ann. de Mal. de l'oreille, etc., 1899, XXV), describes a growth of the right side of the pharyngeal vault which from description was doubtles sof transitional origin. He was able to extract it through the nose. Michalkin (Mediciniske Obosrenje, 1899, No. 5), describes a vascular fibroma which grew from the base of the sphenoid. There is no mention of rapid growth, hence the tumor may have been stationary, a typical fibroid as described by Schreiber. Richter (Monat. f. Ohrenheilk., 1901, XXXV, p. 64), reports two examples of typical retromaxillary fibroids, which, in Schreiber's classification, would be classed as typical extrapharyngeal polypi. Halasz (loc. cit.), describes a typical fibroid of the pharyngeal vault which has caused secondary polypi in the nasal fossae. Coolidge (Boston Med. and Surg. Jour., 1898, CXXXIX, 491), reports an undoubted case of typical polypus with basilar attachment, as do Lanise, (Ann. de mal. de l'oreille, etc., 1899, XXV), Jacques, (Rev. med. de l'Este. 1900, XXXII, 182), Schmidshusen, (Wein. med. Woch. XLIX, 1153), and several others. Arslan enumerates various cases treated in his clinic in Padua, (Arch. ital. di otol., 1898, VII), but details are often wanting. This somewhat scanty material shows the infrequency of the typical nasopharyngeal fibroid, which, indeed, is well enough known, but it also reveals the fact that such rare and interesting conditions are half the time described in a most imperfect and reprehensible fashion. It is a common rule in medical literature to describe conditions which are both unusual and of great interest with unusual care; but there is a notable exception made in the case of these growths. When we add that the ultimate termination of these cases with or without treatment, is seldom described, the necessity of creating a new

literature for this subject becomes readily apparent. Notes should be taken according to a blank form. The point of origin of the tumor and the principal tissue of which it is composed are matters of fundamental importance, and hardly less important is the rate of growth. On the other hand, the location of the mass, its prolongations and secondary adhesions, while they determine indications for treatment, must be regarded as strictly secondary and non-essential characters. The same is true of certain admixtures of tissue elements, such as unusual vascularity, etc. The growth should, of course, be classified according to their essential features. Thus, those which originate from any portion of the nasal mucosa by a thin pedicle and which have the consistency of simple intra-nasal polypi form such a sharply marked class of growths that there is no excuse for confounding them with any other. Zarniko, Moldenhauer and others have fixed their essential pathological characters as follows:

They are ordinary, soft polypi which originate in the back portion of the nasal fossae; they tend to attain a considerable size and eventually it may become difficult to discover the exact point of origin; they tend to an ovoid shape and as a rule are of solitary occurrence; they are not myxomata, but consist largely of fibroid tissue which gives them some degree of firmness, although the tissue is in an aedematous condition and may at times be cystic. These growths, while they may cause much discomfort, and deformity, and may give rise to operative dangers and difficulties, have none of the semi-malignant tendency of the typical naso-pharyngeal polypi. They occur with tolerable frequency and some of their characters are well known, and they are amenable to many different resources of therapeutics. There appears to be little gained in reporting observations in detail.

Tumors which grow from the region of the transition between the nasal fossae and the nasopharynx are not as well defined as the preceding. Their characters vary with the precise site of origin. But while firmer in texture than the soft tumors of intra-nasal origin, and generally held to represent a true hybrid between the latter and the hard fibroid of the nasopharynx, they appear to partake largely of the characters of the more benign growths in that they grow from a slender pedicle and often attain an extreme length reaching even to the larynx. In reading descriptions of miscellaneous cases it is not difficult to recognize under the

description of true polypi of the nasopharynx, tumors which belong with greater probability to the class under consideration, and generally speaking, the presence of a thin pedicle and a certain softness of texture should place any tumor growing from the base of the skull in this class.

Before isolating the typical fibroid, we must allude to the atypical, stationary tumor which agrees with the preceding in texture and origin, but which after attaining a moderate development remains stationary. Such tumors may often be recognized in literature and the failure to recur, after operation, especially after electrolysis, is doubtless attributable to the tendency toward limitation of growth.

Sarcoma of the nasopharynx bears not the slightest similarity to true fibroid polypus, although the latter, because of its tendency to recurrence has been sometimes erroneously regarded as a fibrosarcoma. Actual sarcoma in this locality is soft and tends to early disintegration. It is known, however, that typical fibroids can undergo sarcomatous degeneration.

Growths in the nasopharynx, otherwise than the forms of polypi just enumerated, should be omitted in this connection. All such tumefactions as hypertrophied turbinates, adenoids and the various rare tumor formations already mentioned (chondroma, sarcoma, etc.), should never be confounded with any of the fibrous structures just described. All the polypi are essentially fibrous growths of varying density.

As already stated, the teaching that the typical fibroid originates from the base of the skull, appears to be erroneous. Growths offering all the characteristics of typical fibroids originate from a variety of bony localities and any radical separation of these varieties according to locality is doubtless unwise.

Diagnosis.—Retro-nasal polypi which simply grow from the nasal fossae into the nasopharynx are readily distinguished by their considerable volume, oval shape and slender pedicle, although when the mass has filled the pharyngeal vault its origin is not always recognizable. Transitional polypi present the same characters in the main, but are of somewhat firmer consistency, while the origin from the choanal margin can usually be made out. Typical nasopharyngeal polypi are distinguished by unusual firmness of texture and breadth of attachment, and from the fact that they stand in no definite relationship with the nasal fossae. They need not originate from the base of the skull, for they have been observed to

grow from the vertebral column, pterygoid fossa and in fact all of the osseous structures which are in proximity to the nasopharynx save those which make up the nasal fossae themselves. Angiomata are simply highly vascularized fibromata. We must not forget the important distinction between rapidly-growing and stationary fibromata, from the standpoint of prognosis and treatment.

Fibromata need not be confounded with true sarcomata which in this locality are soft and quickly break down, with the production of a fetid discharge. They do not attain large dimensions. It is possible, however, for true polypi to undergo sarcomatous degeneration; and under these circumstances we find a softening of the dense fibrous tissue but little else which would serve for diagnosis. Doubtless such a condition would scarcely be recognized until the tumor was removed or examined microscopically.

Enchondromata are extremely rare. They have been known to grow from the basilar cartilage, and appear to represent a transformation of ordinary fibroids, from which it would be difficult to distinguish them clinically.

TREATMENT.

Under this head we may consider both the actual practice of reporters as shown in their cases, as well as the principles laid down by systematic writers.

Taking the actual case reports of the past few years, we may divide the material into tumors of intranasal origin; transitional forms and typical fibroids.

I. POLYPI OF INTRA-NASAL ORIGIN.

Here there appears to be almost absolute unanimity, the great majority of reporters using the simple cold snare.

II. POLYPI OF TRANSITIONAL ORIGIN.

The treatment pursued for these growths varies somewhat as will be seen by a survey of a certain number of cases.

Loeb (Annals of Otol. and Rhinol., May, 1898), used the galvanic-caustic snare upon a tumor of probably transitional origin. Polyax employed the cold snare successfully in a similar case.

Thorner (Med. News, 1899, LXXIV), removed with the cold snare a large mass, evidently of transitional origin.

Weil removed a transitional tumor by the galvanic-caustic snare and Texier, after failure with the latter, removed a similar growth

with forceps. Chiari also used the galvano-caustic snare on a growth from the choanal margin.

A large tumor removed with the galvano-caustic snare by Halasz appears to have been of transitional origin, but may have been a typical fibroid.

In a tumor of probable transitional origin (myxofibroma), Powell (loc. cit.), did a laryngotomy, then split the soft palate and removed the mass with cold snare and scissors.

Delie (loc. cit.), removed what seems to have been a tumor of transitional origin through the nose after first performing turbinectomy. The pedicle was then cut through with a bistoury.

It appears from these reports that while most operators succeed with some form of snare in removing these transitional growths, others for some reason or other, feel obliged to employ mutilating operations.

III. TYPICAL OR ANTI-TYPICAL FIBROIDS OF THE NASO-PHARYNX.

Richter (l. c.), recommends the galvano-caustic snare. If the insertion is road multiple galvano-caustic puncture may be necessary to contract it.

Rice (l. c.), employed precisely the same treatment in the case cited by him.

Coolidge (Boston Med. and Surg. Jour., 1898, CXXXIX), removed a typical fibroid with the simple cold snare.

Michalkin (l. c.), appears to have effected a permanent cure of a typical fibroid by electrolysis.

Jacques (Rev. med. de l'est, 1900, XXXII), first reduced in size a large typical fibroid with electrolysis and finished the removal by Moure's method of morcellation. The latter recommends a special locking forceps, the blades of which are introduced singly.

Schmidshusen (Wien. med. Woch., XLIX, 1153), also uses electrolysis to reduce size then uses the galvano-caustic snare and cautery for residues.

Schafer recommends the Partsch operation for all large tumors which extend from the nasopharynx to other localities and cause pressure lesions. In this operation the roof of the mouth is cut through to expose the base of the tumor which is then removed by a chisel, cautery snare, etc. Bony and soft parts are then sutured.

Lanise (Ann. de mal. de l'oreille, 1899, XXV), removed a typical, large, rapidly-growing fibroid by resection of the two upper maxillae and palate after preliminary tracheotomy.

It is therefore, apparent that the milder measures are often of service in these cases, especially when they are combined and used for long periods of time. On the other hand, when the tumor possesses all the characteristics of the typical fibroid, such as rapid growth and invasion of surrounding cavities the most radical intervention appeals to a certain proportion of operators as strictly indicated. There can be little doubt that many recoveries after mild intervention had to do with the atypical or stationary fibroid as described by Schreiber.

Turning to systematic writers on indications and methods, we find that Escat (Arch. de Laryngol., 1900, XIII, 89), like most special practitioners, is entirely averse to all mutilating operations upon sound tissues. When a growth is pedunculated a galvano-caustic snare is passed through the nose. If the growth has no pedicle or, as with typical fibroids, it must be attacked with special locking forceps as used by the author, Doyen, Mome, etc., and by curettes having bilateral and side-to-side motions. Prolongations are extirpated by cautery snares or special rectilinear forceps.

Ricanetesi (Arch. ital. di otol., 1900, IX, 321), after enumerating all the various devices for operation through the natural passages, such as the cold and hot snares, fingers, curette, blunt hook, forceps, etc., states that the best method in a given case is that which can be used most rapidly.

Arslan (Arch. ital. d. otol., 1898, VII), recommends the snare, hot or cold, for all tumors of limited insertion. In half a score of cases he appears to have employed no other treatment. Once he used the sharp curette of Moritz Schmidt.

Richter (l. c.), believes that the galvano-caustic snare with or without puncture to reduce size should be sufficient in all cases. Schafer, as already mentioned, advocates Partsch's operation of going through the upper maxillae in extreme cases. Delie (l. c.), speaks of Doyen's rasp and his own sharp curette for cases beyond snaring. The palate must be held aside by a thread.

SUMMARY.

To summarize the contents of the preceding pages in the brief period allowed it appears that there is no approach to any fixed and inevitable plan in filling the various indications for the management of these growth and that each individual proceeds along the lines suggested by his own experience and caprice. The forceps which has enjoyed wide general vogue in the past is now somewhat distrusted by reason of the

frequency with which accidents follow its use. Somewhat similar has been the experience of the profession with the hot snare, for the advocates of this method have become less enthusiastic than of yore because the results attained are so often unsatisfactory; so that to-day, we do not read of so many cures by the galvano-caustic loop as in former years.

Conservative practitioners are inclined to look with favor upon the cold snare, as having stood the test of time better than any other resource. I am inclined to regard it as the best procedure in the vast majority of selected cases. Certain growths are, of course, beyond the reach of such simple devices, although no rules can be laid down in this respect. Typical fibromata may often be removed by simple snaring, while growths which are intrinsically much less formidable are sometimes unapproachable by this means. A certain minority of nasopharyngeal growths can only be removed by the most radical procedures, such as splitting the intervening hard and soft parts and suturing the flaps after the extirpation of the tumors.

THROMBOSIS OF THE LATERAL SINUS AND INTERNAL JUGULAR VEIN, WITH RE-INFECTION OF THE SINUS AFTER LIGATION OF THE VEIN.*

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The existence of an aural discharge exposes the possessor to serious lesions, and its chronicity only augments the dangers which may arise at the slightest provocation. Absence of subjective symptoms offers no immunity to the insidious advance of a septic process, especially in this region, as we frequently find extensive necrotic destruction without much local information.

Though acute purulent otitis of a septic character, such as seen in cases following or accompanying an attack of influenza, may rapidly extend to the mastoid and sinus, clinical data shows that chronic disease is the usual fore-runner of thrombosis in the sinus and jugular vein.

Catarrhal exacerbations often revive to virulent activity what seemed to be a smouldering ember. Traumatism will also reawaken the dormant energy of a septic process, and cause its deleterious influence to spread with astounding rapidity. In the case which is detailed later on, a blow on the side of the head proved to be the exciting factor, though the purulent disease had existed for ten years without causing the patient much annoyance. Occasionally, local traumatism will stimulate the latent process, and thus cause a renewed activity of an old infection, as seen in those cases of mastoid involvement following the removal of excessive granulation tissue, or large aural polypi. Here we disturb nature's protecting zone, and expose a wounded area to the invasion of pyogenic organisms.

Bacteriological examinations of the aural secretion aids us in determining whether or not surgical measures are indicated, for the presence of streptococci or pneumococci certainly augments the probable invasion of the mastoid and neighboring tissues.

Chronic suppurative otitis does not heal spontaneously, and if a

*Patient presented before Otological Section, N. Y. Academy of Medicine, Oct. 9, 1901.

sudden cessation of the purulent secretion occurs, we must anticipate the possibility of an impending complication.

Thrombosis of the lateral sinus may arise from direct extension of the mastoid disease to the vessel walls by a perisinous abscess. Obstruction in the tributary veins may act as a direct cause of the sinus involvement. Macewen has called our attention to the anatomical difference between the right and left temporal bone. His investigations show that the right bone is much thinner at the site of the lateral sinus. This is due to the large size of the vessel on that side, and probably accounts for the greater number of cases of thrombosis affecting this side.

In an acute virulent otitis with retarded rupture of the drum head where the jugular fossa protrudes into the tympanic cavity, the bulb is likely to become affected early in the disease. Jansen has seen such a case and found that the upper part of the jugular vein was necrosed as early as the seventh day, though the sinus itself was not involved. He calls our attention to the possibility of a phlebitis of the bulb in cases of pyemia, particularly in acute cases, where the sinus itself may appear healthy.

Herewith give a brief history of my patient:

F. R., seventeen years of age, was admitted to my service at the Manhattan Eye and Ear Hospital on August 9, 1901, complaining of pain in the right ear and over the mastoid. He gave a history of having had suppuration in this ear off and on for ten years. Of late, the disease seemed to be quiescent, until a week before his admission to the hospital, when he received a blow over the right ear, which caused a bloody discharge for two days, with severe pain.

The examination revealed an old suppurative process, with the membrana almost entirely absorbed, and some foul-smelling pus in the middle ear, together with an area of diseased bone situated postero-superiorly. There was slight tenderness on pressure over the mastoid antrum, with the temperature at 100.8° F. and pulse 84.

Leiter's coil, with the usual hot bichloride douches every two hours, with rest in bed, was the treatment applied for twenty-four hours.

On the following day there was pain over the right side of the head, so the ice-coil was discontinued to avoid masking of symptoms. Twenty-four hours later the patient experienced a distinct chill of severe character, followed by the characteristic rise of a

septic temperature. The skin was moist, of a peculiar sallow appearance, and the tongue was heavily furred.

On opening the mastoid, August 12, not much pus was found in the antrum, but considerable granulation tissue was removed. Diseased bone was curetted from around the sinus, and as the walls of the vessel were discolored, same was incised from the knee to the bulb. A septic thrombus filling the lumen of the sinus was removed, and a free bleeding showed that the upper portion of the vessel was thoroughly patulous. The upper sinus wound was then plugged. No return flow followed the use of the curette from the inferior portion (the bulb) of the sinus, so the jugular vein was ligated about two inches about the clavicle. As no macroscopical evidence of disease of the vein was observed, no attempt at its resection was made. As soon as the ligature was applied, the vein immediately filled with blood, showing that a free circulation was being carried on through the tributaries. The antrum wound was dressed separately from that of the sinus.

For two days the patient felt quite comfortable, when a slight rise of temperature was recorded. The dressings were removed, and the neck wound was found clean and satisfactory. The antrum opening showed some pus, but the sinus wound was doing nicely. Thought it advisable to thoroughly curette the antrum at this time, until a clean return of fluid through the external canal, after syringing, showed that drainage was unobstructed. The temperature remained around 99° F. for five days, then suddenly arose to 105° F. with the appearance of chilly sensations.

On August 17th some pus was found in the region of the jugular bulb, so I removed all the bone external to the bulb, but could not find any pocket or diseased tissue. The wound was then dressed daily, but the temperature still fluctuated, and an occasional chill showed that sepsis was quite active.

On August 27th a purulent secretion was observed coming from the upper opening of the sinus. The patient was narcotized for the third time, and the external bony wall of the sinus was removed to within an inch of the torcular. An incision was made through the sinus up to the end of the bone opening, and an infected thrombus was curetted away. Free bleeding again followed this procedure, and was allowed to continue for a few seconds. A plug was then introduced into the posterior opening of the sinus, and the whole wound was thoroughly cleansed. The sinus opening was packed separately from that of the antrum.

From this operation the temperature gradually subsided to 99° F., all symptoms improved, and the patient made a good recovery.

Though the openings in the antrum and sinus were treated separately, the secondary infection of the upper and posterior sinus wound came from the antrum, as the gauze dressings were soiled at this site, and consequently accounted for the disease found at the third operation. The upper portion of the sinus was thoroughly cleansed at the first intervention, and the free flow of blood after the removal of the thrombus at that time showed that the channel was unobstructed. There can be no doubt that the continuance of septic symptoms arose from the re-infected sinus wound, for as soon as this region was cleansed these symptoms disappeared and recovery followed.

The diagnosis of sinus thrombosis is practically based upon the appearance of pyaemic symptoms accompanying an acute or chronic purulent disease of the middle ear. High temperature alone may be seen in uncomplicated otitis, but when we observe the characteristic septic temperature wave, associated with chills or chilly sensations, we can feel almost certain that the sinus is affected. Periphlebitis may cause pyemic symptoms, but Jansen remarks that the ordinary extradural collection of pus is not attended with decided fluctuating temperature. The mastoid process and dura mater are unfavorable to resorption and consequently abscesses in this process in the adult may exist for a considerable period, without causing a pronounced rise of temperature.

Probably the most prominent symptom during the course of a sinus infection, is the rigor accompanied by profuse perspiration. The patient may have chilly sensations without having a distinct chill. Furthermore, the chill may be of short duration, and be missed in the record of the case. In a patient upon whom I operated for extensive disease of the sinus and jugular vein¹ only one chill was observed during the time the case was under our observation, and yet the disease had extended to within an inch of the clavicle.

In my experience, the "cord-like" sensation of the vein could not be detected, and, consequently, I do not consider this symptom a reliable one. There is at times an enlargement of the lymphatic glands along the course of the vein, and this condition may be mistaken for the thrombosed vessel. A more constant symptom is tenderness on pressure along the anterior border of the sterno-

mastoid muscle, with rigidity of the neck muscles. Edema over and posterior to the mastoid process is often present, and when the deeper venous circulation is obstructed, the swelling is seen in the posterior cervical triangle. Headache is seldom absent, and extends over the entire side of the head, though it is more intense over the frontal region. Pain on pressure over the mastoid, along the course of the sinus, usually exists.

The symptom of stupor did not appear in any of the cases under my observation, nor was there any vomiting. Digestion was much disturbed and the tongue was heavily coated.

If the clinical picture warrants the diagnosis of jugular thrombosis, we should limit our palpation over this area, to avoid the possible dislodgment of septic material. Numerous cases have been reported, in which recovery followed the usual mastoid operation and evacuation of the perisinous abscess, though the sinus itself was thrombosed. In these instances the obstructing clot had not broken down or the thrombus was a parietal one and did not interfere with the circulation.

We are not justified in opening the sinus, surrounded as it is in many instances by septic secretion, unless systemic symptoms exist. Von Bergmann and Jansen² reject the incision of the sinus for therapeutic reasons, and particularly for diagnostic purposes, as long as a good current of blood is circulating through the vessel. Nature frequently guards important structures by providing a barrier of granulation tissue, and we must be cautious in our local manipulation, that the sinus wall is not damaged in the attempt to remove the surrounding disease. A healthy sinus becomes speedily infected if such violation occurs, be it accidental or exploratory. In a case recently reported by Dr. C. Kipp³ of thrombosis of the sinus, following an acute purulent otitis, of five weeks' duration, considerable septic secretion was removed from the sinus, but all efforts to establish communication through the bulb failed, and the operation had to be discontinued, as the patient showed signs of shock.

In this instance, the jugular vein was not tied, nor was the discolored wall of the vein removed, and though a large gluteal abscess developed in a week's time, and was opened, the patient made a good recovery. The author points to this case as one showing the possibility of a cure, with a sinus containing fluid pus, and a thrombus at the bulb presumably infected by contact with the purulent fluid, without ligation of the vein.

It is quite probable that the drainage established by the free opening in the sinus and the subsequent cleansing, removed the exciting factor, though some of the septic material reached the general circulation, as shown by the development of the gluteal abscess. The pleasant results in this case permits the belief that the thrombus in the bulb certainly resisted further septic invasion, otherwise pyemic symptoms would have continued.

We must not overlook the experience, that interference with the venous circulation of the cerebral cavity, may cause serious if not fatal results. Such instances are reported by Linser,⁴ Rohrbach and Kummer.

In the case mentioned by Linser, the internal jugular vein was tied on account of adhesions due to a former inflammatory process, during an operation for goitre. Death resulted on the following day from symptoms of accelerated pulse and respiration with great cyanosis. The autopsy showed the cause of death to be edema of the brain, which was said to be due to the diminished size of the left jugular fossae, and when the large vein (right) was ligated, the retarded circulation caused the above condition.

In cases of sinus thrombosis with septic symptoms, where no communication can be established through the bulb, we should always protect the general circulation by ligating the jugular vein and even re-secting same, and its tributaries, if they appear involved.

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38 East Sixtieth Street.

RAPID DILATATION AND THE PROLONGED USE OF INTUBATION TUBES IN STENOSIS AND IN CICATRICAL OCCLUSION OF THE LARYNX. REPORT OF TWO CASES.*

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One of my chief reasons for reporting the first case is to call attention to the means which I employed to stretch the stenosed larynx.

Case 1.—Ernest L., Italian, aged 17 years, dealer in flowers, was admitted to the Massachusetts General Hospital on January 8, 1900. His family history was negative. He had had gonorrhea one month before entrance but no specific history could be obtained. He said he was well until June, 1899, when a lump appeared on the left side of his neck, which grew larger and was opened by an Italian doctor. During the latter part of July the patient noticed a spot over the thyroid cartilage which was soft and which on straining increased to the size of a marble. This was opened by the same doctor and air escaped and the patient breathed partially through this opening. Up to this time there was no change in the voice and no difficulty in breathing. The opening in the neck healed and the same expansile tumor appeared again. In the latter part of August this tumor was opened in the surgical out-patient department and a fistula established. This remained open until about the middle of November with hoarseness and dyspnea gradually increasing and cough at times paroxysmal. On December 9th tracheotomy was done on account of dyspnea and cyanosis. The patient was put on specific treatment at this time but nothing was done locally for the larynx. I saw him about six months later, in the summer of 1900, when he was wearing a tracheotomy tube. On closing the tube with his finger he could speak with considerable effort in a low whisper and apparently could get extremely little air through the larynx. His throat was unusually difficult to examine, but after several trials I succeeded in seeing the larynx. The chink of the glottis was extremely narrow, owing apparently to an infiltration of both sides of the larynx, the ven-

*Read before the American Laryngological Association, Boston, May 26, 1902.

tricular bands being also very much swollen. There was no evidence of ulceration or signs of there having been any, nor was there in any other part of the body any evidence of an active syphilitic process. For a time I attempted to dilate the stenosis with Schroetter's tubes without success. The infiltration was so firm and the stricture so narrow that I was unable to pass the smallest tube, using considerable force. I then determined to try the passage of intubation tubes under ether, with the intention of leaving one in, if I succeeded in passing it. There was considerable delay in obtaining the hard rubber tubes which I desired, but finally on December 26th he was readmitted to the hospital and on the following day I attempted intubation. My first difficulty was that the larynx was so far down, largely due, no doubt, to the fact that the patient had worn a tracheotomy tube so long, that I could not, try as I might, reach the arytenoids with my finger. I was thus unable to properly guide the intubation tube into the larynx and after several unsuccessful attempts was obliged to give it up. A few days later I had him etherized, then, while he was lying flat on his back with a pillow under his shoulders, I removed the tracheotomy tube. I then introduced a small female urethral sound, about No. 15, French, through the tracheal opening up into the larynx so that I could feel the end of it with my finger in the throat. I continued to pass the successive sizes in the same manner until I reached No. 37 French. The last few sizes passed with considerable resistance. The tissues seemed to stretch rather than tear and there was very little bleeding. I next tried to insert a large adult intubation tube in the ordinary manner, but without success, meeting the same difficulties as at my previous attempt to intubate. I then passed a pair of long, narrow, slightly curved forceps into the tracheal opening and up through the glottis. On this I put the intubation tube. Then pulling the forceps back through the tracheal opening and following the tube with the forefinger of my left hand, I was able to get it into place in the glottis. There was comparatively little reaction after all this manipulation of the larynx. The patient had a little difficulty in breathing and could take no food by mouth so was fed by enemata. On the next day (January 2, 1901), he took in addition milk by the mouth in small quantities. Evening temperature was 101° F. On January 4th his temperature was normal. He took milk and custard by mouth. Had no difficulty in breathing through the tube. On January 5th at 7:30 a. m. he coughed up the tube. Marked dyspnea came on at once and the

old tracheotomy wound had to be opened and a tracheotomy tube inserted. Later in the morning the intubation tube was reinserted under ether. The problem now was to devise some means to hold the tube in place so as to avoid any such accident in the future. This would have been just the case for the projecting retaining arm suggested by Rogers of New York and spoken of by Simpson in his very thorough paper on intubation in chronic stenosis of the larynx, read before this Association last year. Unfortunately I did not know of it at this time. Nor was I allowed any time to devise some means for retaining the tube, for the next morning the patient insisted, in spite of all that I could say, upon having the intubation tube removed and the tracheotomy tube replaced. He and his relatives had been so alarmed by the accidental coughing up of the tube that they became absolutely unreasonable. I was therefore obliged to give up the case and discharge the patient with the tracheotomy tube in as before. There seems good reason to believe that if I could have continued treatment I should have obtained a good result as far as the patency of the larynx was concerned. In this case the ordinary O'Dwyer extractor was not long enough to reach the tube and I was obliged to first raise it from below through the tracheotomy wound before I could remove it. I wish to call attention once more to the use of female urethral sounds in dilating this stenosis and to strongly recommend their use to anyone having a similar case. They could not have worked more satisfactorily if they had been made expressly for the purpose. It had been my intention to keep a tube in this larynx for at least six or eight weeks continuously, just as I did in the following case:

Case II.—Gertrude B., aged five years, was brought to see me at the Throat Clinic of the Massachusetts General Hospital in the latter part of April, 1900, wearing a tracheotomy tube. Her father gave the following history:

She was taken ill with diphtheria on December 25th, 1899, and was treated at a suburban hospital, where it was found necessary to do intubation. She coughed the tube out and it had to be reinserted several times. In the latter part of January the tube was removed temporarily, but when it became necessary to replace it it could not be done quickly enough. The child became cyanotic and tracheotomy was performed. Every attempt to dispense with the tracheotomy tube after this was followed by dyspnea and cyanosis. On laryngeal examination I found the vocal cords united together

for nearly their whole length by cicatricial membrane, leaving only a small open space at the posterior part of the glottis. It was found, however, on closing the tracheotomy opening temporarily with the finger that not the least breath of air entered the lungs through the glottis. It was consequently assumed, rightly as it proved, that there must be other cicatricial tissue below the cords which completely occluded the larynx. While I was endeavoring to make up my mind what was the best method of treatment to pursue in this case my attention was called to an article of Dr. John Rogers, Jr., in the *Annals of Surgery* for May, 1900, on the treatment of stenosis following diphtheria by the prolonged use of intubation tubes. I at once wrote him to obtain fuller information on some points and desire to express here my thanks for the interest which he showed in my case. There was some delay in obtaining the hard rubber intubation tubes required. But finally, on July 10th, the operation was performed. The child was etherized and placed in the Rose position. The tracheotomy tube was removed and Dr. Conant, into one of whose wards the child was admitted, made an incision upwards in the median line of the neck through the superior tracheal rings. The cicatrices in the trachea were divided as they were found. A probe was then passed up from below through the opening at the posterior portion of the larynx until I could feel it with my left forefinger passed through the mouth down to the larynx. The opening was then carefully dilated with hemostatic forceps under the guidance of my finger resting on the arytenoids. During these procedures the tracheotomy tube was reinserted to pass a 10-12 intubation tube, which proved too long to get by the angle formed by the roof of the mouth and the posterior pharyngeal wall. An 8-10 tube was inserted without using much force. The tracheotomy wound was partially closed with silk-worm gut sutures and a dry dressing applied. The child breathed with ease through the laryngeal tube. Salt solution enemata, ten ounces every six hours, were given and nutritive enemata, every six hours. Several unsuccessful attempts were made to feed by stomach tube, the child vomiting the liquid every time, some of which got into the trachea through the intubation tube. On the fourteenth day she was able to swallow soft custard without distress. The hospital record on July 31st says:

"Since last note child has been improving rapidly. Takes any kind of soft food but is unable to take liquids." August 7th—"General health excellent. Wears tube without discomfort. Is able to

take soft solids without difficulty but cannot swallow liquids except cracked ice which she allows to dissolve in mouth." August 15th—"Salt solution enemata omitted as patient can now swallow liquids without difficulty." On September 4th, the tube having been in about eight weeks, I determined to remove it. The child was etherized and placed in the dorsal position with a pillow under the shoulders. The tube was then withdrawn. It came away with some difficulty and there was some hemorrhage. The respiration became noisy and labored and finally ceased, the chest wall moving spasmodically up and down without entrance of air. Tracheotomy was at once performed through the old scar and artificial respiration soon started the breathing and the color became normal. The child was up and about the ward the next day with no symptoms. Six days later, on September 10th, I removed the tracheotomy tube and found that she breathed partly through the larynx. A small valve-like piece of granulation tissue, situated above the tracheotomy wound was removed and the wound drawn together with crepe lisle. On September 14th, when the tracheal wound was nearly closed the respiration again became labored and noisy and color poor, necessitating immediate opening and dilating of the wound and reintroduction of the tracheotomy tube, as there was no one on hand who could put in the intubation tube. On September 17th I again put in the 8-10 tube under ether. It went in with some difficulty, showing that there had been already some contraction. Thinking that a tube of larger diameter would be better I had the 10-12 tube shortened to the length of the 8-10 and introduced it on September 21st in place of the latter. The patient was now allowed to go home with the tube in. After being in a little more than a month I removed this tube. There was some bleeding but the child soon breathed easily. In six days I was obliged to replace the tube, owing to rapidly increasing dyspnea. I left it in for five weeks and then removed it. It came out with some difficulty and there was a slight amount of hemorrhage. This time it was out for nearly two weeks and then had to be reinserted. After being in for five weeks it was again removed on February 1, 1901, again with some hemorrhage. On February 11th, I passed the 8-10 and 10-12 tubes but did not leave them in. On February 25th I went through the same procedure. I began now to be somewhat encouraged and let the patient go nearly a month without treatment. On March 22d I thought I had better pass the tubes again. On attempting this under ether I found that there had been

so much contraction that I had to begin with a 4-5 tube. I stretched the strictures up to an 8-10, which went in with so much difficulty that I did not attempt the larger tube. On the next afternoon I was hastily summoned to the hospital, where I found my little patient breathing with great difficulty. She had begun to breathe badly at 6 o'clock that morning. I introduced the 8-10 tube and left it in, and a week later I substituted the 10-12 for it with ease. This was removed in a week. Breathing again appearing slightly obstructed at the end of three weeks, April 24th, I again passed the tubes, beginning with the 4-5 size and leaving the 8-10 size in. On May 3d I substituted the 10-12 size for this, leaving it in two weeks. On its removal there was almost no bleeding. A week later, finding that there had been some contraction, I left this tube in again after passing the two smaller sizes. On June 14th I removed the tube, and there was practically no bleeding. Up to the present time, over eleven months, the child has breathed naturally through the larynx. The appearance of the larynx is now as follows: The glottis is free from cicatricial membrane. The left vocal cord is held in position of extreme abduction, probably as a result of the scar formation. Below this cord the tracheal wall appears swollen and somewhat redder than normal. The right vocal cord appears to move freely, but not sufficiently so except by great effort to come in contact with the abducted left cord. The patient, consequently, speaks only in a whisper, except when by an effort she makes a low gruff tone.

I have reported this case in full in order to show more graphically than I could in any other way its obstinate character and the frequently recurring contractions of the cicatricial tissue until at times I begin to despair of ever being able to dispense with the intubation tube. The bleeding which occurred at each removal of the tube I believe came from a granulating surface, and the fact that there was no bleeding at the last removal I take to mean that this surface had healed. I think I might have curtailed the time of treatment in this case if I had put in the shortened 10-12 tube at first. I hardly think it would have been possible to have put in a tube a size larger if I had had one, as the 10-12 tube seemed to fit very snugly. The cicatricial tissue in this case was the result of ulceration due more probably to the diseases than to the frequent intubation. Northup's case reported by Rogers is similar to mine. In his case frequent auto-extubations finally necessitated a tracheotomy. Death followed in about a month from pneumonia and at

the autopsy the larynx was found completely occluded by a cicatricial diaphragm. Rogers says: "The commonest cause of post-diphtheritic stenosis necessitating long continued intubation is hypertrophy of the subglottic tissues accompanied by a chronic inflammation. Intubation is in no way the cause of this, as it occurs irrespective of the operation. Less often there is an ulceration, and subsequently the formation of a greater or less amount of cicatricial tissue and contraction. This likewise is not the result of the intubation except in rare and practically unavoidable instances." That stenosis of the larynx following diphtheria, especially the variety due to the formation of cicatrices is rare, statistics show most conclusively. Out of about 800 intubations during the last seven years at the Boston City Hospital, Dr. McCollom informs me that he has seen but one case and that recently. This case was a child four years old, in whom there was apparently a complete occlusion of the larynx, no air coming through it. The child is still wearing a tracheotomy tube, as the mother refused to have anything done. Roger's paper makes mention of only two reported cases in which the presence of cicatrices was actually proved. Summing up the experience of a number of observers whom he quotes, he concludes that "a reasonable estimate of its (chronic stenosis) average frequency would therefore be not far from one in every 100 intubations." I have been unable to find in medical literature since the publication of Roger's paper any report of a case like the one which I have just presented.

A NEW DEVICE FOR SYRINGING THE EAR.

LEWIS G. LANGSTAFF, M.D., BROOKLYN, N. Y.

This device, a cut of which is herewith shown, is regarded by the author as a decided improvement on any appliance in use for the same purpose. A simplified form, more especially for patient's own use, is shown in Fig. No. 2.

These instruments may be used attached to a fountain syringe by a glass connecting tube. The simpler one may be directly connected to a piston syringe by a section of rubber tubing; this, I have found to be very handy and efficient, giving plenty of force for wax or foreign body.

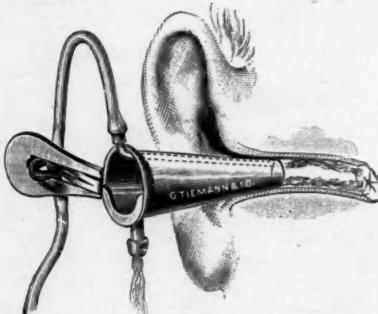


Figure 1.

The cut explains itself so clearly that I need only add that the cone portion of it, which is inserted into the external meatus, consists of a middle-sized cylindrical ear speculum; the spring cut-off acts by releasing the pressure of the thumb by which the fluid is allowed to run. As it acts automatically and instantaneously, there is no slopping or spurting of water over the patient on removing the cone from the ear. I believe that the greatest aid to the cure of suppurating middle ear inflammations is thorough cleansing, and conversely, the most frequent prevention of cure is inefficient removal of discharges. With this apparatus the patient can wash out his ear as well as a skilled nurse and with a confidence that it is thoroughly done.

For continuous irrigation, I cut off a narrow section of rubber tubing and slip it over the end of the cone. This permits the water from escaping between the meatus and the cone. In this way a patient's ear might be irrigated while he is lying down if necessity required. As the entering stream is very small, a smaller quantity of water is required. It will be observed that the stream flows along the upper wall on the drum head and returns over the floor of the meatus. A current is produced which reaches all parts. A glass douching tip is on the market slightly similar to this instrument in principle. Its in-flow tube is centrally situated, the stream tends to strike the drum direct; the out-flow is obstructed by this in-current and the result is simply a commotion of water without definite direction. In the case of wax, the simpler form with piston syringe (to get more force), should be used. The small stream constantly bearing on one point has an excavating power which is rapidly effective in breaking up and removing the wax.



Figure 2.

The short connecting rubber tube which should be about $1\frac{1}{4}$ inches long and thick walled, (to support the cone in a horizontal position), allows the cone to be gently insinuated in the meatus, and prevents that joggling which may occur when the tip is a fixed or rigid one. As not more than a tenth part of the inner lumen of the cone is taken up by the flattened in-let tube, the speculum value of the instrument is not noticeably impaired. This feature has an obvious value. To sum up, the advantages claimed are:

1. Efficiency in skilled or unskilled hands.
2. Safety—no risk in unskilled hands of forcing the drum through obstructed outlet.
3. Requires less water and thus allows prolonged continuous irrigation. (As the meatus is narrow and will only hold about ten minimis, large streams are unnecessary.)
4. Painless and comfortable; children do not object to its use.
5. Useful as a speculum—meatus in view while in use.
6. No slopping over physician or patient.

19 Seventh Avenue.

SOCIETY PROCEEDINGS.

LARYNGOLOGICAL SOCIETY OF LONDON.

Seventy-Fifth Ordinary Meeting, June 6, 1902.

E. CRESSWELL BABER, M.B., President, in the chair.

The president called upon Mr. Charters J. Symonds to open the discussion

The Diagnosis and Treatment of Malignant Stricture of the Oesophagus.

Mr. Symonds said:

Mr. President and Gentlemen:

To put the subject of this debate briefly, it may be said that the diagnosis of malignant stricture of the oesophagus resolves itself into the passage of a bougie to ascertain the presence of an obstruction, and the treatment in deciding the best way to introduce food. One sees, however, so many cases treated for dyspepsia that it is necessary to consider a few of the early symptoms. In speaking to an audience of experts, I will limit myself to what appear to me to be essential points, and endeavor not to weary you with unnecessary details.

A gradually increasing dysphagia is the common history in most cases. In by no means a small number the onset is sudden, e. g. at a particular meal; a man choked over a mouthful of meat, and from that moment had difficulty. Another, after shouting himself hoarse in welcoming the men from the Powerful in the city, had choking the same evening, and developed cricoid obstruction. In one instance a loathing for food, so great as to require feeding by a tube, was the leading sign for some weeks. In another the man complained of pain as the food passed the center of the gullet.

I have seen one instance where there was no dysphagia; the man was anaemic and was thought to have cancer of the stomach, and when his evacuations were black this view was strengthened. At the autopsy, we found the greater portion of the oesophagus occupied by an ulcerating carcinoma, which had enlarged and not constricted the lumen at any point.

Before a bougie is passed a good many patients are treated for dyspepsia, and much valuable time may be lost. One sees such patients losing flesh, not so much on account of inability to swallow, but because the diet was gastric. It must be remembered that so-called "dyspepsia," i. e. loss of appetite, "tightness at the chest," water brash, some pain and distension, with irregular bowels, may be the result of oesophageal obstruction. The restricted diet usually prescribed tends to increase the symptoms. A diagnosis can generally be made by asking the patient to swallow liquid. This when marked is characteristic; he makes one ordinary effort, followed by one or more smaller ones; these are accompanied by certain peculiar movements of the neck. Then he brings up a little gas, often hits his chest, and says now it has gone. Kussmaal's sign, viz., listening to the back to hear the fluid arrested at the stricture and then trickling through is always interesting, and when the observer does not pass a bougie is sometimes valuable. I am sure from what I see that an unnecessary fear exists in the minds of many as to the danger attending the use of a bougie. Provided that a fair size be employed, and no force used, and especially that no pressure be made when the patient strains to extrude the instrument, there is no danger. The bougie should be advanced in a deep inspiration or on an act of deglutition, held still on any explosive effort, and again advanced on inspiration. That there are dangers with fine bougies, and in advanced disease, one cannot deny. In passing the cricoid one must wait for the inspiration which follows the first glottic closure, or make the patient regurgitate by passing the left forefinger far back on the tongue. To press at this moment in close cricoid stricture may send the bougie into the trachea. Once more it may be added that in impermeable cricoid obstruction, where the patient is particularly tolerant, there is special risk of entering the trachea. It is remarkable to note how a patient will bear the presence of a large bougie in the windpipe for some time without coughing. In any doubt we must pass the bougie not more than twelve inches, and examine its position with a laryngoscope. These special points refer rather to treatment; it seemed but right to refer to them here.

With these general remarks, I will next ask you to consider the diagnosis of the disease as it affects the three situations, viz., the upper third and cricoid orifice, the lower end and gastric orifice, and the central region.

i. Upped Third.—Stricture at the cricoid or beginning just be-

low the ring is, in my experience, always malignant. It begins at $8\frac{1}{2}$ to 9 inches from the teeth, and usually involves 2 or 3 inches. The chief peculiarity is the tendency to cicatrise and contract; so marked is this feature that a specimen may be indistinguishable to the naked eye from a chronic syphilitic or other ulcer. If the margin, however, of such a specimen be examined microscopically, squamous epithelial growth will, I believe, always be found. The contraction is irregular, so that a bougie in passing may have to turn several corners. In the diagnosis of disease at the cricoid I have found three conditions give rise to confusion:

a. The one most closely resembling organic disease is dysphagia, occurring in elderly people. In the first instance that came under my notice, the patient was a woman aet. 70; there was dysphagia for solids, and fluids caused trouble; a bulb passed with difficulty, there was a streak of blood, and altogether I thought gravely of the case, and gave a serious prognosis. The symptoms soon disappeared, and the patient, after some years, is still well. A similar instance came before me again in a woman over 70, and another in a man over 80. In the persistence, in the indefinite obstruction to a bougie, and in the age of the patient, there is sometimes a close resemblance to malignant disease. There is also an absence of the nervous symptoms seen in younger people. The condition suggests some organic change, giving rise to temporary interference with deglutition. I have thought that possibly an excessive cricoid ossification, or some bony outgrowth interfering with movement might explain these cases.

b. The nervous form, especially when occurring in men, and in medical men above all others, can only be settled by time. Suddenly such a patient has difficulty at a meal over a mouthful of food, and later cannot swallow a pill or a crust of bread. He has to be more careful in eating than before. It is well known that such is often the history of the early stages of malignant stricture. The passage of a bougie is not easy, a little blood may result to further confuse the issue, or one may fail to pass the bougie beyond the cricoid without undue force. Where such symptoms occur in a man of forty-nine or fifty, the diagnosis is not easy. In both affections the freedom of swallowing varies, in both soft solids are better dealt with. I would say, however, that in malignant disease, the patient almost always permits the passage of a bougie, and that there is found irregularity of the surface indicating disease of some standing. Practically in the majority there is no great difficulty, but in a

few cases—especially if they happen to be medical friends—it may give rise to no small anxiety. In most cases it is best, I believe, to give a positive opinion as to the simplicity of the case and wait with your own secret fear.

c. The third condition is that of a pharyngeal pouch. When well-marked, the symptoms of this complaint are so defined as to quickly clear up any difficulty. The subject has been so well dealt with before this Society that I need only refer to Mr. Butlin's communications.

d. Malignant disease of the lower end of the pharynx, involving the arytenoids, cannot be excluded from a discussion upon oesophageal stricture, and as the same treatment is required, I must refer to it here. The main distinctions are the pain accompanying dysphagia; the voice early has the peculiar sound produced by the presence of oedematous arytenoids; again, the growth can usually be seen in the early stages. It appears first as a pale cushion below the arytenoids, and gradually advances, giving rise to early oedema of one or other arytenoid. These patients often continue to swallow fairly well and can, so far as I have seen, always be relieved by a soft tube. The direct extension to the larynx is the special feature of disease in this situation. Those who have seen many of these cases will have observed the greater frequency in women, and in many at an age nearer thirty than forty. I may add that in one instance—a woman also—the early mass seen below the arytenoid disappeared under iodide of potassium. I have not myself encountered syphilitic disease lower than the pharynx. I have one patient with slight obstruction just above, or at the cricoid, who had originally—some thirty years ago—syphilitic ulceration involving the larynx.

2. In the middle third a sarcoma and a myoma may occur, and give rise to obstruction. In one of my cases a sarcoma was found as a localised tumor, but clinically it was indistinguishable from the ordinary carcinoma. With such rare exceptions as these, all obstructions of any moment in this section of the oesophagus are due to carcinoma. It is very noticeable that aneurysm and mediastinal growth rarely give rise to serious dysphagia. Once only have I passed a bougie in a case of aneurysm, and the sensation communicated to the hand was, I thought, diagnostic of the disease. The case was sent to me with a diagnosis that mediastinal pressure was absent. The bougie passed over a convexity and smoothly descended without any difficulty.

Esophageal pouches occurring in the middle and lower sections are sometimes very difficult to detect. In one patient, *æt.* 72, symptoms of obstructions had existed for several years; a bougie was arrested 14 inches from the teeth; on one occasion it slipped past, and there seemed abundance of room. Under choloform, the largest bougie was several times guided past the orifice. At this time he regurgitated a good third of his food. For another two years he went on much the same, and died somewhat suddenly from another malady. There was no doubt a pouch in this case. The long duration was a strong point against malignant stricture; the second, that he could always take solids.

In another instance a man was sent to me for pyloric vomiting; without going at length in his case, I may say that the symptoms pointed to obstruction low in the gullet, and the large quanity of food retained to the existence of a pouch. He was fed by a tube, and the vomiting ceased. I thought it better that the man should learn to feed himself in this way than undergo a gastrostomy. After a year of such treatment, he is in good health and able to do his work.

3. The lower end, i. e., a point $15\frac{1}{2}$ inches to 17 inches from the teeth is, in my experience, the only locality where we find a simple obstruction. One is justified in saying that, as the obstruction is in this situation, the cause may be simple, and that the mechanical difficulty being overcome, the future carries more hope than does obstruction in any other situation. I have notes of five such cases, two with pathological evidence, while three are clinical. In the first two the symptoms were those of obstruction only, and they died unrelieved. One of the three living cases has had symptoms for some years, and is relieved from time to time by the passage of a Coude bougie; another has swallowed well since a gastrostomy was performed over a year ago, never having required to use the artificial opening; while the third has had symptoms for twenty years, and requires a bougie from time to time. I will again refer to the use of the Coude bougie in obstruction at the lower end; let me here, in referring to diagnosis, insist upon its great value. When a small, straight bougie will not pass, a large Coude may slip through easily. The two specimens referred to showed a simple fibrous thickening, allied, no doubt, to that seen in the pylorus.

Slighter degrees of obstruction occur in this situation, which may be called spasmotic. I have seen only one marked case, a lady *æt.* 30, who, when I saw her, had had obstruction for twenty-four hours.

A bougie encountered resistance, which yielded as would a tight sphincter. The obstruction was definite, not a purely nervous form. This brings one to the whole question of "spasmodic stricture," so called. Personally I must express a disbelief in such a complaint, apart from the hysterical cases. Of these latter, the two worst occurred, the one in a boy $\text{æt. } 7$, and the other in a man $\text{æt. } 35$, both hospital patients, and both greatly emaciated. The boy was cured by the temptation of a penny currant bun, the man took a pair of the largest bougies. All the cases brought to me for spasms, except the hysterical, have a basis of malignant growth. I have mentioned before that in a growth in any situation there may be, in the early stages, much difficulty from added spasm and varying mechanical alterations in the growth itself, permitting the taking of solids on one day, and of fluids only with difficulty on another.

When the stomach is infiltrated by malignant disease, and so reduced as to hold but a couple of ounces—the so-called leather-bottle stomach—the resemblance to obstruction at the cardiac end of the gullet is very close. In one instance the patient could retain about $1\frac{1}{2}$ ounces, any larger quantity being rejected. But this amount, taken frequently, was retained, and the diagnosis thus established. This was confirmed by operation.

In another, with obstruction at the cardiac orifice, I found, on performing gastrostomy, only a small portion of the stomach free and available for establishing fistula. I have no doubt that we had entered the stomach through the oesophagus, and that the inability to retain the fluid was due to the reduced capacity. After the operation we were never able to introduce more than two ounces at a time.

Of oesophagoscopy I have no personal experience. Its value was recently demonstrated to me by Professor Mickulicz, of Breslau, who showed me a case of actinomycosis recognized by this method. A piece of growth was removed by forceps and examined.

I may summarise the diagnosis in the following way:

1. Among early symptoms we may base so-called "dyspepsia," nausea, and repulsion for food; pain alone when the central district is affected.
2. That the passage of a bougie is the only way to clear up the case, and that its employment need not be feared.
3. That extra-oesophageal disease rarely gives rise to serious dysphagia.
4. That spasmodic obstruction, apart from the hysterical form,

has always, when decided, an organic cause, and that this would be better called intermittent dysphagia.

5. That with regard to the special districts it may be said:

- a. That all organic obstruction in the upper third is malignant, and has a special tendency to cicatrise.
- b. That in the central half of the gullet, a sarcoma or a myoma, both rare diseases, may cause fatal obstruction; that here, also, a pouch may give rise to difficulty in diagnosis, but can generally be excluded.
- c. That in the lower end alone does simple stenosis occur, and that here there may be difficulty in distinguishing from cancer of the stomach causing great reduction of the cavity (leather-bottle stomach).

Finally, in estimating the extent of the disease, the special value of the steel bulb is noted, and also the use of the Coude bougie in obstruction at the lower end.

Treatment.—Speaking generally, it may be said that we can relieve by mechanical means only, and that two methods are available, one to overcome obstruction by inserting a tube of some kind, and the second to open the somach below the obstruction, i. e. perform gastrostomy.

I would put the general question of treatment in the following way, as applying to all cases:

1. While the patient can swallow fluids and semi-solids, and while a bougie can be passed and plenty of nourishment taken, he may be left, so long as:
 - a. He can swallow well,
 - b. A small bougie, No. 12 (catheter gauge), can be passed.
2. If the dysphagia increases, even though a bougie can be passed, then a tube must be inserted or gastrostomy performed. These conditions are seen in the soft fungating forms.
3. If a bougie cannot be passed, or goes with difficulty, then the same course must be followed, as we know that complete closure may occur at any time.
4. If both conditions arise, i. e., the patient cannot swallow and a bougie cannot be passed, then immediate mechanical treatment is required.

Probably most have summarised their treatment in some such fashion.

I have not advocated the passage of bougies with a view of dilating the stricture. It is injurious in that it irritates and leads to in-

crease of obstruction ; it may split a hard stricture and set up rigor and fever from absorption. In my own practice, I have abandoned this method in all malignant cases. The object of the small bougie to which I have referred is simply to secure the route so that at any time a tube can be passed for feeding purposes, or the time fixed for gastrostomy. More than this has, in my experience, proved injurious. As applying to all cases, I would here again refer to the advantage of attempting the passage of a tube after a night's rest and a dose of opium.

Turning next to each region, in the upper third we have to note the great tendency to rapid closure and to the certainty of complete obstruction sooner or later. Two methods are available here : (a) the long feeding-tube, and (b) gastrostomy. Though I have successfully employed a short tube, it does not, as a rule, rest comfortably unless the highest part of the stricture be at least $1\frac{1}{2}$ inches below the cricoid. Of the long tubes, the best is that made from rubber drainage-tube, introduced by the whalebone director. When this cannot be passed, the retention of a silk-web tube for a few days will so enlarge the passage as to enable the other to be inserted, or an ordinary urethral catheter will answer, and sometimes the Coude variety will pass. If the patient be fairly tolerant, the method is a useful one. The tube will last a long time, so much as nine months. If it comes out, it can always be replaced if the attempt be made at once. Should the tube, when rejected, be soft and have lost its elasticity, then a fresh piece must be used. It should never be removed for cleaning, as re-insertion may be difficult. I have conducted many cases to the end with this tube ; the main objection is that saliva cannot, as a rule, be swallowed, though some patients will sip fluid by the side of the tube.

Another objection is that it does require some dexterity, perhaps, to insert in difficult cases, and much patience, but not more of either than does the passing of a catheter in stricture of the urethra. The form I have for many years used is, as you see, somewhat roughly made, the end of a piece of ordinary No. 10 drainage tube being sewn up with silk, and a big eye cut above. Note that the end of the introducer is passed into the eye, and a small plug of wood is inserted into the closed end to prevent the introducer slipping through. The proof that the thinnest-walled rubber tube would keep a malignant stricture dilated was first pointed out by Mr. Berry. We must contrast this method with gastrostomy, and I would say that where the patient is low and unable to bear abdomi-

nal section it is our only plan. As an alternative, I find it has sustained life in comfort equal to the most successful gastrostomy, and greater by far than when the stomach contents escape and cause excoriation. When the patient is intolerant and objects, then we can offer only gastrostomy. The longest time I have known one of these rubber tubes remain unchanged was thirteen months. The obstruction was at the circoid, and great difficulty was encountered in passing the first long feeding-tube. The rubber form was easily introduced after a few days' residence of the silk-web tube. From time to time small pieces of the rubber tube had to be removed, as it split near the silver canula. The patient died with the original tube in position. Others have worn it for varying periods. In two cases patients have also worn tracheotomy tubes. One now under treatment has had a rubber tube in eleven months and a tracheal tube four and a half months. The same method answers admirably in disease of the pharynx. In this form the obstruction to a bougie is never very great, and I have had cases fed by a member of the family three or four times a day. Its application is limited. After many trials, I have no doubt that the best tube is the gum-elastic silk-web, with a closed end and two large eyes, and that the best sizes are Nos. 10, 12 and 14; smaller ones are of little use for permanent wear, and dilatation up to 12 is best conducted by the long tube. The vulcanite pattern introduced by Renvers I have found of no value; it is too hard and too short. The most suitable cases for this method are those where the stricture is short, and has a tendency to contract; then a four-inch tube answers admirably. The position and length of the stricture are ascertained by a steel bulb. As the disease progresses it may be necessary to use a six-inch tube.

In the central portion, i. e., for obstruction occurring from a point ten inches from the teeth to fourteen and one-half inches, we can use a short tube in addition to the long one. When introducing this method in 1884* I said I hoped it would give relief in a certain number of cases, and it has fulfilled this forecast and no more.

The experience published in two former papers† represent very well the use and value of the short tube, and later experience has confirmed it. Of recent cases I may cite the following:

A man aet. 55^o. Dysphagia began early in 1898.

*Clin. Soc. Trans., vol. xviii.

†Brit. Med. Jour., April, 1887; Lancet, March and April, 1889.

February 24th, 1899.—A short tube was inserted, the stricture, a short and contracting form, being fourteen inches from the teeth.

April 21st.—The tube removed at patient's request; great difficulty in inserting another.

May 2nd, 1899.—A tube inserted.

July 28th, 1899.—A new tube introduced by Steward.

March 3rd, 1900.—The tube was still in and acting well, i. e. over seven months.

Some time later he showed signs of extension to the lung, and died on June 3rd, 1900.

Duration before tubage, twelve months; duration under tubage, sixteen months. Of these certainly thirteen were passed in comfort; and he attended to his business.

In another case the short tube acted perfectly up to the time of death, the treatment covering a period of more than a year.

Disease involving the lower end and cardiac orifice I have found difficult to treat by tube. I admit that occasionally one has been successful with a short tube or a long one, but as a rule it is rejected on account of the contraction of the diaphragm. Early gastrostomy seems to me the best advice. I advise that this be done while the patient's general condition is good. One very strong point in favor of this course is that, as I have said earlier in this paper, simple stenosis may occur in this situation. Given, therefore, a successful gastrostomy, life may be indefinitely prolonged. Moreover, it may be possible, especially with the Coudé bougie, to dilate the obstruction after the gullet has had a rest. We may at least anticipate some return of swallowing.

Of course, as in other situations, operation would not be undertaken so long as a bougie could be passed and the patient could swallow freely.

Early gastrostomy applies especially to malignant disease in this situation.

I must mention one remarkable case referred to before. A woman with great dysphagia, emaciation, and obstruction at the lower end. A Coudé bougie could be passed. As she lived in the country, and as dysphagia was increasing, I performed gastrostomy. From that moment the power to swallow returned, and the secondary stage of the operation was completed. It has not been necessary to use the stomach opening. The woman remains so well—now more than a year from the operation—that I think the case must have been one of simple obstruction. Dilat-

tation could not have been effected by suturing the stomach to the abdominal wall, and the only other suggestion one can offer is that a tortuosity has been straightened.

In view of the occasional occurrence of simple stenosis at the cardiac orifice, it seems to me our duty to press operation upon our patients when the dysphagia is marked.

The use of chloroform to facilitate the introduction of a tube is a question for discussion. Personally I have always had an objection to it, but I must admit that in cricoid strictures it has been of great service, and deserves a wider employment. So easy is it, however, to pass a small bougie or tube into the trachea, that I make it a rule, after passing a tube for twelve inches, to examine with the laryngoscope to see that it is really in the oesophagus. In one case, when this precaution was omitted, after waiting some time and there being no spasm or cough, milk was poured down and passed into the lung with disastrous consequences.

In another the tube passed through a tracheal fistula.

Reviewing the whole question of treatment and contrasting tubage and gastrostomy, one may say as regards the latter that it at once disposes of all difficulty as regards swallowing; that in obstructions at the cardiac end it should be performed early; that in all patients intolerant of the tube and bougie, time should not be wasted. In advanced cases, where leaking can be prevented and immediate feeding undertaken, the operation may be successful, and there is reason to expect that such a method has been found.

Unfortunately, many cases among the poor are obtained in too advanced a stage for operation to be considered, and there are others who decline operation. It, therefore, is necessary to perfect, as far as possible, the alternative method of tubage. With regard to cricoid strictures and disease in the lower part of the pharynx, I am quite satisfied with the rubber tube, and believe it to be superior to gastrostomy. We want a tube so constructed that it will not easily be regurgitated, and I believe this will be produced. Once a tube has been retained it is never wise to dispense with it, even for a day. I have several times yielded to the patients' wishes in order that they may enjoy the luxury of a solid meal and been unable to re-insert another tube. The insertion of the new tube should immediately follow the withdrawal of the old one, be it a short or a long tube.

The short tube has, as I said, a limited use, being of little service in disease of the two orifices. But in the central section I

still find it valuable. It is open to the objection that it is liable to get blocked, and that, again, some skill is required to insert it. With cases where there is no cough I have known it to remain unchanged for ten months, and in another three months. There is no necessity to remove these tubes for cleansing purposes, the silk, protected as is now done by fine rubber tubing, will last for months, and the security of the silk is the only anxiety.

When cough arises from extension of growth, or hemorrhage occurs, the tube will get blocked, and then a long feeding-tube must be used—either a silk-web or a rubber. It is unnecessary on this occasion to go into details, so I will put the question of tubage thus:

The short tube is useful in strictures occurring from a point ten inches to a point fourteen inches from the teeth. It is no use when there is cough on swallowing, indicating perforation. It is of little value when the growth occupies a long stretch of the gullet. It is seldom of use in strictures involving the cardiac orifice, and cannot, as a rule, be borne in disease involving the cricoid level.

In suitable cases it has, however, given good results up to the time when perforation occurs, and then, as a rule, a long feeding-tube answers for the few weeks that remain.

A word must be said as to the dangers of intubation. One has had accidents, fortunately in only one was life much shortened. In one case a tube was passed, under chloroform, through a perforation into the trachea. This showed the danger of chloroform.

In another a soft and ragged oesophagus was perforated, the man being in the last stage of the disease.

In another a tube in the tight cricoid stricture passed into the trachea; the man did not cough, and gave no sign that such an accident had occurred until signs of pneumonia developed.

These accidents occurred some years ago, when one was endeavouring to improve the method of treatment. Since one has systematically used the laryngoscope to ascertain the position of the tube in cricoid strictures, several similar accidents have been avoided. It is essential to use this check when operating under chloroform.

SUMMARY OF TREATMENT.

1. In cricoid obstruction the long rubber tube gives excellent results. When not well borne, gastrostomy, if selected, should be performed early.

2. In disease of the central portion the short tube is serviceable in a fair number of cases, and, when it acts well, is superior to any other method. It must be replaced by the long feeding-tube when pulmonary symptoms arise.

3. In disease of the cardiac orifice tubage is so uncertain that gastrostomy should be performed when dysphagia becomes serious.

Dr. Herbert Tilley: I think that most members will agree with me that the term "classical" is one which might well be applied to the address that Mr. Symonds has given us on the subject of the diagnosis and treatment of malignant stricture of the oesophagus. His experience in this class of cases is so unique that anything which others may say on the matter can only be in the nature of accentuating facts which Mr. Symonds has already brought forward. I will not attempt to do more than this. I wish to bring before the notice of the society two cases which seem to illustrate the apparent simpleness of some of the symptoms which are so easily overlooked in the early stages of malignant stricture of the oesophagus, and to which Mr. Symonds has referred in the early part of his address.

The first case was seen some four years ago in University College Hospital. A middle-aged man was admitted to a medical ward suffering, or supposed to be suffering, from ulcer of the stomach. The patient had been brought in complaining of acute pain in the stomach, and on three or four occasions he had vomited large quantities of blood. He was very anemic, and in the absence of any physical signs in the chest or stomach, it was very difficult to say what organic lesion was present. He took food well, and had no difficulty in swallowing; these were puzzling features of the case. I was given an opportunity of examining the patient, and found that although the voice was fairly clear, yet the left vocal cord was paralyzed. Of this, there were no symptoms so far as the voice was concerned. On further examination I saw, about three inches down the trachea, a small, pale, nodular mass projecting into the lumen of the trachea. On the strength of this observation I made the diagnosis of malignant disease, probably of one of the mediastinal glands, the enlargement of which had obstructed the trachea. As to whether that gland was a secondary growth no one could say, for the simple reason that there was no evidence of any primary growth in the oesophagus or elsewhere. In the course of a few days the man died from another attack of severe hemorrhage. At the post-mortem examination a

malignant ulceration of the lower end had caused any obstruction, and the gland I had seen projecting into the trachea was a secondarily infected mediastinal gland. The case is extremely interesting as illustrating (1) how frequently such symptoms may mislead as to the true nature of the case, and (2) the light which may be thrown on an otherwise obscure case by means of a laryngoscopic examination.

The second case was seen about two months ago. The patient, a man aged 51, had lost his voice for two months, and complained of certain stomach symptoms, e. g. flatulence, anorexia, inability to swallow solid food, because it immediately induced sickness, etc., and his illness had been attributed to "gouty oesophagitus," whatever that might mean. For some twelve months he had been complaining of a feeling of sickness after taking food. On examining the larynx, I found complete bilateral recurrent paralysis; the patient could only speak in a whisper, and had a very distressing and ineffectual cough. On examination of the chest, no evidence of aneurysm could be found. Attempts were made to pass oesophageal bougies, but the smallest one could not be passed beyond the level of the lower end of the manubrium sterni. I therefore took this to be a case of malignant disease of the oesophagus. A fortnight later I saw the patient again, and on further examination found above the manubrium sterni and in the region of the left lateral lobe of the thyroid, a stony hardness, and many small enlarged cervical glands above the clavicles. The patient died a few days after the consultation, and unfortunately no post-mortem was obtainable, and it was therefore impossible to be sure as to the situation of the primary growth, i. e. whether it was in the thyroid gland and involved the gullet, or vice versa.

These two cases illustrate the fact that sometimes one may get invaluable information as to the cause of the patient's symptoms by the use of the laryngoscope. In both the cases briefly outlined, the suspicion raised by finding the vocal cords paralyzed was the main factor in the formation of a correct diagnosis. My experience has been very much in accordance with that of Mr. Symonds with reference to an apparent oedema of the upper end of the oesophagus, which occurs most commonly in young females suffering from malignant disease of the oesophagus in the neighbourhood of the cricoid cartilage. I remember seeing two young women, one aged 21, the other aged 28, in which this curious oedema of the upper end of the oesophagus was followed very shortly afterwards by death from malignant disease in the situation referred to.

(To be continued.)

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SELECTED ABSTRACTS.

My Method of Operating in Chronic Empyema of the Maxillary Antrum.—DR. GERBER (Konigsberg i Pr)—*Deutsche Med. Wochenschrift*, Nov. 27, 1902.

After describing the unsatisfactory results of other methods tried by him, the author comes to the conclusion that the most effective method is to open the antrum broadly from the canine fossa, and then make a counter-opening into the nose in the middle meatus. The antrum is thoroughly curetted and cleaned out and the canine wound immediately closed. The middle fossa is chosen, as offering a better chance for a large opening into the nose, through which permanent drainage may take place.

VITTUM.

A Case of Accessory Thyroid at the Base of the Tongue.—DR. FRIEDRICH TEWELES.—*Weiner Klin. Wochensch.*, No. 8, 1902.

The patient was anemic, weak, exhausted by the least exertion. The tumor, which was 5 cm. in diameter, was removed per orem. When the tongue was strongly pulled forward the tumor slipped under the soft palate, and the field of operation was very accessible. Hardly any blood was lost and recovery was rapid. The patient's general condition is greatly improved. The tumor was spherical in shape, with a tough capsule of connective tissue. On section there was discovered a yellow hard nucleus the size of a bean, from which fibrous bands radiated in every direction. The parenchyma was reddish-yellow and did not ooze at any point. The tumor was traversed by numerous blood vessels.

The microscopic picture was that of a thyroid gland. Follicles crowded close together and covered with a flat epithelium, sometimes with and sometimes without a lumen, but nowhere containing colloid material. Between the groups of such follicles, run bands of connective tissue and capillary vessels.

VITTUM.

The Submucous Alveolar Tissue of the Larynx, and its Significance in the Spread of Oedema.—*Edin. Med. Jour.*, May, 1902.

This paper commences with a description of three cases of edema of the larynx, one of which proved rapidly fatal. In this case the patient suffered from pulmonary and laryngeal tuberculosis and death occurred suddenly from acute edema of both aryteno-epiglottidean folds, completely occluding the upper laryngeal aperture. In the other two cases, sacrifice of the edematous areas, relieved the symptoms. The second part of the paper deals with an anatomical investigation into the arrangement of the submucous tissue of the larynx, demonstrated by means of a series of injection experiments. Carmine gelatine was used for purposes of injection, as this substance was found to permeate the tissues readily when heated, and to set quickly when cooled. In this way the extent and limitations of the loose submucous areolar tissue in the glosso-epiglottic fossae, in the aryepiglottic folds and pyriform sinuses, in the false cords, the true cords and in the subglottic area, were demonstrated. The opposition offered to the passage of the fluid over the free margin of the epiglottis by the attachment of the mucous membrane along that border and the lesser degree of resistance presented by the denser layer of tissue beneath the median glosso-epiglottic and pharyngo-epiglottic folds were also well illustrated by the injection experiments. A number of plates demonstrate these anatomical points.

A. LOGAN TURNER.

The Anti-toxin Treatment of Diphtheria in the City of Glasgow, Fever Hospital, Belvedere, during six and a half years.—JOHN BROWNLÉE (Glasgow).—*Glasgow Med. Jour.*, April, 1902.

The author has devoted considerable care to the compilation of a number of tables, a study of which will repay the reader who is interested in the antitoxin treatment of diphtheria. It is difficult to make any detailed analysis of these tables, but there is no doubt of the value of the remedy and of the decrease in the mortality from this disease.

A. LOGAN TURNER.

The Treatment of Thrombosis of the Lateral Sinus Following Middle Ear Suppuration.—E. B. DENCH, M.D., New York, *The Am. Jour. of the Med. Sciences*, May, 1902.

After reviewing the various steps by which operative procedure in the mastoid was advanced from the simple perforation of the cortex by a drill to the extensive exposure of the lateral sinus, which steps towards radicalism were attended rather with increased recoveries than mortality, the bold operator arrives at the conclusion that not only is the wounding of the sinus a comparatively trivial matter, but that the fatalities ascribed to this accident were most frequently due to the stopping of the operation before the evacuation of the purulent focus within the bone. With a small opening the hemorrhage could not be controlled, whereas with the mastoid cortex entirely removed, it on oppression was easy by pressure, the operation proceeded with the purulent collution evacuated and the patient relieved. Gradually the operator became more daring, and when the sinus was exposed, during the operation, it was carefully inspected and examined for evidences of infection. This was more emphatically the case when the temperature seemed to indicate severe systemic infection. When the sinus was found to contain a clot it was turned out, the sinus wall curetted for the removal of any possible source of systemic infection, and the hemorrhage controlled by firm, aseptic packing. In spite of such radical action in the neighborhood of the mastoid a large proportion of cases of invasion of the lateral sinus terminated fatally, or recovered after a serious general pyemia. Ballance concluded that the direct anemia of infection from the breaking down of the thrombus in the lateral sinus, was through the internal jugular vein, proposed and successfully accomplished the ligation of the blood channel completely shutting out the source of infection. Following this plan some surgeons simply ligated the internal jugular; others divided the vessel between two ligatures, and attempted to wash out the thrombus by irrigation from the sutured end of the jugular up through the sinus wound. A further advance led to the ligation of the tributaries of the internal jugular, and finally to the excision of that vessel from a point low down in the neck to a point just below the entrance of the vein into the base of the skull, all tributary branches being tied off. This latter procedure seems to be the one of election to-day.

The author thinks it "wise in all doubtful cases to remove the internal jugular vein in order to eliminate the element of draft,"

but that when "the patient has been under observation for a few days, and we have a fairly complete temperature record of 24 to 48 hours, showing no marked evidences of systemic infection, the surgeon may rely upon simple clearing out whatever clot may be found." On the other hand cases seen first at the time of operation, in which the sinus cannot be cleared, and in which the surgeon is confident that a certain amount of infected material is left in the venous channel, immediate excision of the internal jugular should be practiced. The operation is not considered a serious one and consumes but little time. The temperature chart is the only sure guide.

F. C. E.

Two Cases of Laryngeal Hemorrhage.—M. ANDERODIAS.—*Gaz. Med. de Picardie*, No. 2, July 12, 1902.

Congestive or neuropathic hemorrhages of the larynx are rare as compared with the submucous interstitial hemorrhages which are met with in variola, scurvy, purpura and Bright's disease.

The author claims that this form of hemorrhage is found only as the result of traumatism and that most frequently the flow of blood is from varicose veins at the base of the tongue, or from the naso-pharynx, the hemorrhage sometimes being sufficient to simulate hemoptysis. After having called attention to the necessity of accurately locating the hemorrhages, the author reports two cases.

The first was in a man of 52 years, suffering from Bright's disease, who was suddenly seized with an attack of complete aphonia, moderate dyspnoea and a light spitting of blood.

An examination showed the larynx to be of a dark red color. The mucous membrane of the epiglottis very congested, the ventricular bands swollen, and the vocal cords in the median line and covered with clots. The lingual tonsil showed neither varices or hypertrophy. After having removed the clots the author could locate the blood oozing from the border of the left ventricular band. After cauterizing with chloride of zinc, inhalations, and especially perfect rest of the throat, the hemorrhage ceased, the congestion diminished and the dyspnoea disappeared.

The author suggests that laryngeal hemorrhage may perhaps be of the same diagnostic value as epistaxis is a symptom of the early stages of chronic nephritis.

The second case was in a man of 53 who had reached the cachectic stage of cirrhosis of the liver, the author believing the hemorrhage to be due to derangements of the hematopoietic function of the cirrhoued liver.

W. SCHEPPEGRELL.

BOOK REVIEWS.

The Practitioners' Handbook of Diseases of the Ear and Nasopharynx.

By H. MCNAUGHTON JONES, M. D., W. R. H. STEWART, F. R. C. S. ED., WILLIAM MILLIGAN, M. D., C.M., HERBERT TILLEY, M. D., AMBROSE BIRMINGHAM, M. D. and ROBERT DWYER JOYCE, F. R. C. S. I., M. R. C. S. Octavo 368 pages. 182 illustrations and 7 plates. Price 10 shillings, 6 pence Net. Published by BAILLIÈRE, TINDALL & COX, London, 1902.

In this era of lengthy treatises and voluminous text books, it is a pleasure and relief to peruse the pages of this excellent handbook. It is concisely written, well illustrated, thoroughly up-to-date and contains more practical and valuable information concerning diseases of the ear and associated areas than any volume of its size.

In this sixth edition the editors have had the co-operation of a number of authorities who have been specially qualified to prepare the chapters assigned to them. Prof. Birmingham and Dr. Dwyer Joyce have prepared the chapter on the Applied Anatomy of the Ear; Mr. W. R. H. Stewart the chapter on the Middle Ear Cavity; Dr. William Milligan, the Chronic Suppurative Middle Ear Diseases including diseased conditions of the Mastoid and Intra-Cranial complications, and Mr. Herbert Tilley, the Accessory Cavities in their association with the organ of hearing. Dr. Dudley Buxton has prepared a condensed and acceptable chapter on the administration of anaesthetics in nasal and aural surgery.

While this excellent volume is modestly termed "The Practitioners' Hand-Book", it may with justice also be called "The Otologists' Reference Book." Thoroughly modern and up-to-date. We commend it most highly.

PROGRESSIVE MEDICINE, VOL. III, SEPTEMBER, 1902. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M. D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia. Octavo. Handsomely bound in cloth, 421 pages, 26 illustrations. Per volume, \$2.50 by express prepaid to address. Per annum, in four cloth-bound volumes, \$10.00. LEA BROTHERS & CO., Publishers, Philadelphia and New York.

This quarterly issue of Progressive Medicine contains valuable chapters on the pathology and clinical varieties of Croupous Pneumonia and its most approved and modern therapy. A most interesting chapter is that referring to the British Congress on Tuberculosis, and separate chapters on the sanatorium treatment and the study of the cure of consumption.

Diseases of the Pleura and Bronchial affections and their treatment, and the affections of the pulmonary blood vessels and of the pulmonary circulation, complete this series of valuable chapters.

In the chapter on Diseases of the Brain, the author reviews Tumors of the Frontal Lobe with report of cases, Sinus Thrombosis and several Forms of Aphasia.

